

# Hierarchical Edge Bundles - Critical Analysis

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CMSC 636 Data Visualization

Assignment 2

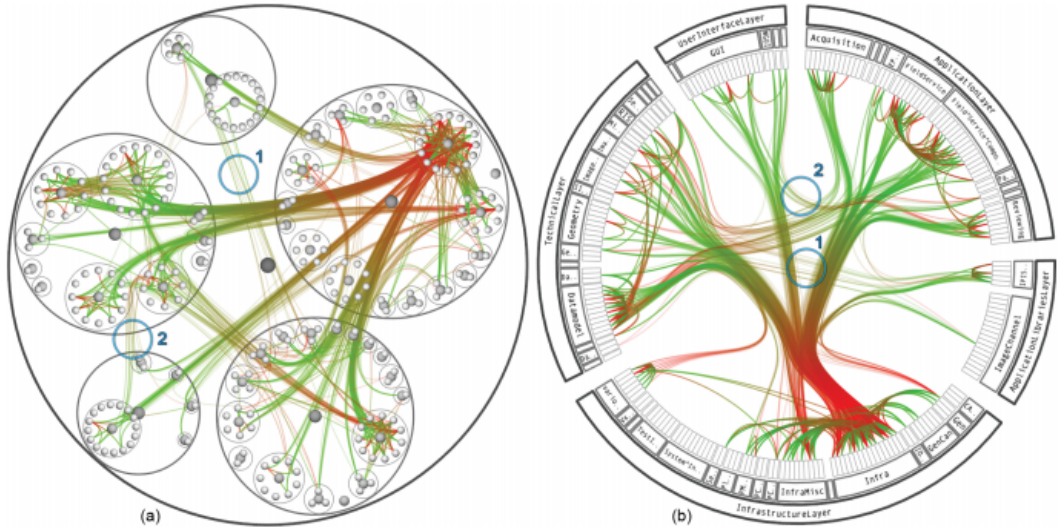
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## 1. Introduction

Recent years has seen exponential growth of data collection. We are in a data rich information poor era. Analysis and Visualization are two important things in the conveying information to the user. Creating usable and interactive Visualizations using these huge amounts of data has become a challenge. There are many visualizations like Parallel coordinates, hierarchial edge bundling and Parallel coordinates are some of the visualization methods that can be used to deal with large datasets. In this paper, we will deal with Hierarchical Edge Bundles which is quiet useful in dealing with datasets having Hierarchical data. Edge bundles help in visualizing adjacency relations in this data. Following figure shows two examples of edge bundling visualization.

## 2. Analysis of Hierarchical Edge Bundles

Data items in a dataset can have different types of relations between. These relationships are primarily two types. Parent-child kind of relationship between data items is called Inclusion relations. Non-hierarchical relationship is called Adjacency relations. Inclusion relations can be visualized using different variations of Trees, graphs etc. This paper discusses the method of dealing with adjacency relations.



### 2.1. Effectiveness

This visualization technique helps in reducing visual clutter by forming clusters instead of using straight line relationships between data points. These clusters are formed by visually bundling adjacency edges together.

## *2.2. Technique*

Edge bundling visualization is drawn by clustering some curves(edges). In the first place these curves are drawn using spline models. B-spline curves, Bezier curves are some spline models for example. Now the questions is the order in which curves need to be drawn. Some curves will be short, some long. So to address the problem of overlapping and occlusion, technique of alpha blending is used. In this technique, the long curves are drawn with lower opacity than short curves making them visible. Another factor that affects the bundles is Bundling strength. Low bundling strength provides low-level node-node connectivity information. High bundling strength provides high level information.

## *2.3. Limitations*

This visualization doesn't discuss the interaction part. How user interacts with the visualization is not discussed. Different ways of modifying the visualizations is also very important to understand hidden information.

## **3. Conclusion**

Most important point that attracted me is about local bundling. This is mentioned in future work where users can select a portion of visualization and vary the bundling strength in that specific are to have local understanding of data. This method is very useful in reducing the cluttering in the visualization, thereby improving information conveyed and more interactive. Users can spot important areas by increasing bundling strength, this results in improving the density of bundles thereby improving particular spots.