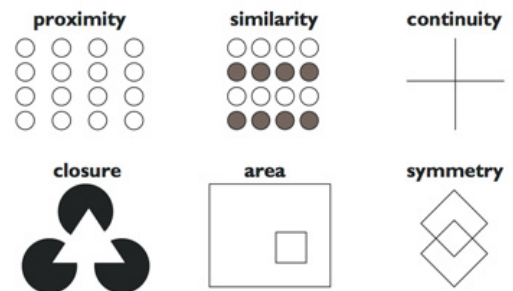


Gestalt Principles in Graph Visualization

Gestalt principles are rules for organization of perceptual scenes. They were introduced in the context of philosophy and psychology in the 19th century and were used to define principles of human perception in the early 20th century. The *gestalt* principles include the grouping of closely positioned objects (proximity), the grouping of objects of similar shape or color (similarity), the grouping of objects that form a continuous pattern (continuation), and the grouping of objects that form symmetric patterns (symmetry). Gestalt principles have been extensively applied in user interface design, graphic design, and information visualization.



Graph is an abstract representation of a set of elements (modelled by *nodes*) and their pairwise relations (modelled by *edges*), with the typical examples being: social networks, computer networks, www, biological networks, and many more. As graphs grow in size their *textual representation* (e.g., list of nodes and list of edges) is hard to read and understand. It is impossible for a human to make any sense from such a textual representation. Here graph visualisation come into play. *Graph visualisation* is a graphical representation of a graph. The most straight-forward way to create a graph visualization is to draw the nodes as dots and the edges as lines (polylines, curves) connecting them. It is clear that by a random placement of nodes and drawing of edges one can not achieve a nice, a useful and a meaningful visualisation. The research areas of Network Visualisation and Graph Drawing are concerned with the development of algorithms that create visualisation with these good properties.

In this thesis you will investigate how a particular Gestalt principle facilitates graph visualization. Gestalt principles have been successfully applied in graphics design, by making the designs more efficient and more appealing. You will investigate whether this is also the case for the graph visualization.

The work on the thesis will include:

- An extensive literature search; reading, summarising publications addressing a particular Gestalt principle in graph visualization
- Organisation of an empirical experiment, to reveal the influence of the particular gestalt principle
- Producing visualisations for the experiment. So, fluency with programming is a must.

Overall, if you are interested in the question "what makes a graph visualisation attractive", you want to learn a bit more about how humans percept visual information, have no problem with programming and are interested in the organisation of a user study, this is a right topic for you.

Requirements: Obligatory: Good programming skills, Lectures Algorithms 1 and 2. Desirable: Lecture "Design and evaluation of innovative user interfaces" ("Design und Evaluation innovativer Benutzerschnittstellen"), "Visualization" ("Visualisierung").

Contact: Tamara Mchedlidze
Email: mched@iti.uka.de

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