Visual Visualization Surveys for Fun and Profit

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As early as 1967 in his book "Semiology of Graphics", Jacques Bertin underwent the exercise of producing a hundred different visualizations for the same dataset [1]. In summary of that exercise, he wrote:

> *To construct 100 different figures from the same information requires less imagination than patience.*

This remark epitomizes the required effort of ploughing through a seemingly endless number of encoding possibilities and options, as part of the visualization process. Today, almost 50 years later and equipped with modern technology, Bertin's observation remains just as valid. Over the past decades, visualization research has taken it upon itself to transform the advances in computer graphics and display technology into an unprecedented wealth of visualization techniques. Each individual visualization technique is certainly extremely helpful to solving the very particular problems it set out to address. Yet in combination, their sheer number also increases the burden on those who are trying to find their way through this heap of visualization possibilities. One result of this development is that even experts have a hard time to maintain an overview of what already exists and reinventions begin to appear. Some examples of such reinventions are shown in Figure 1.
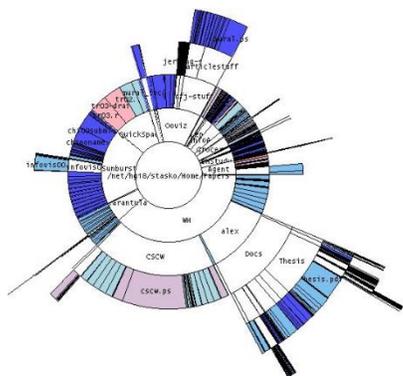
In 2011, the treevis.net online survey and bibliography [2] set out as the first website to reclaim the lost overview for the domain of hierarchy visualization and tree drawing. Meanwhile, it lists almost 300 visual representations together with links to their publications. Treevis.net differs from other initiatives, such as the famous Annotated Bibliography for Graph Drawing [3], by presenting the techniques in their visual form and providing a simple query interface for faceted searching on their visual features. The searching and filtering modalities reflect an underlying design space [4]. This focus on visual representation helps immensely to find and re-find visualizations, as well as to communicate complexity and implications of different visualization decisions to clients and users. Other surveys have since adopted this idea – e.g., survey.timeviz.net for visualizations of time-dependent data [5], financevis.net for financial visualizations [6], and textvis.lnu.se for visualizations of textual data [7]. The source code and the underlying data from treevis.net are freely available to encourage other uses and mash-ups. For example, the survey of multifaceted visualizations at multivis.net [8] reuses large parts of the underlying JavaScript code, while keshif.me/demo/treevis.html wraps a more sophisticated online browser around the XML data from the treevis.net website.

Overall, the impact of the treevis.net website has been astounding and it is not only frequently used for teaching visualization classes, b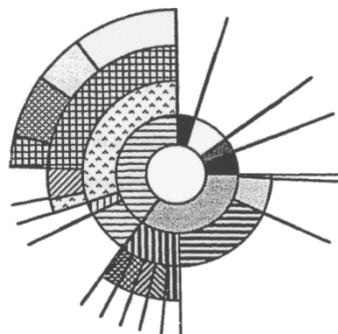ut it also helps to disseminate visualization research into application domains. For example, treevis.net gets a large number of citations and mentions from the life sciences, in which tree structures play an essential role. Such a comprehensive collection furthermore allows for the analysis of the existing body of visualizations, as it was done only recently by applying phylogenetic analysis to the body of tree visualizations to retrace the evolutionary development of this domain [9]. Future research will certainly find other creative uses for visualization collections.
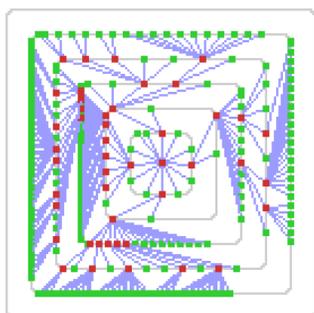
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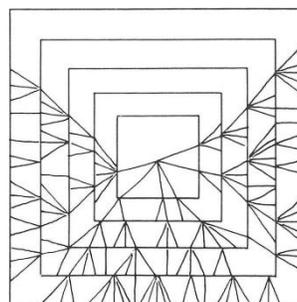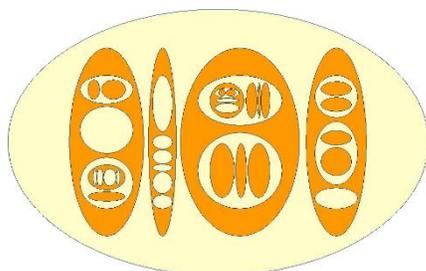
Sunburst [Stasko & Zhang 2000]
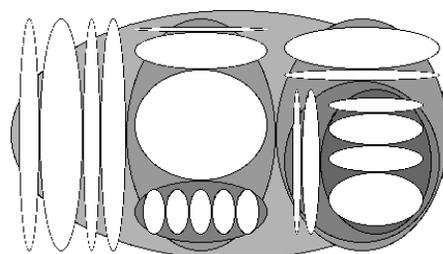

Spoked Polar Treemap [Johnson 1993]

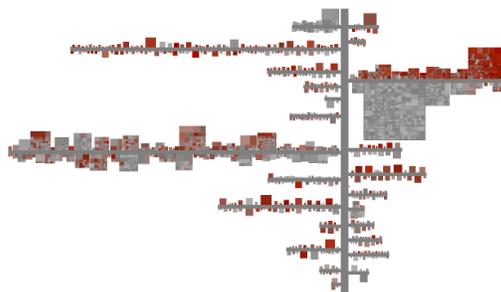Rectangular View [Karstens et al. 2003]
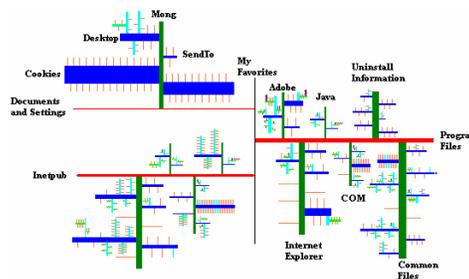

Square Sector Construction [Bertin 1967]

Ellimaps [Otjacques et al. 2007]

Treemap with Ovals [Johnson 1993]

Street Layout [Kratt et al. 2011]

Fractal Tree [Ong et al. 2005]

Figure 1. Unknowingly reinvented tree visualizations (left) and their uncited predecessors (right).