Graph-Drawing Contest Report

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Abstract. This report describes the Ninth Annual Graph Drawing Contest, held in conjunction with the 2002 Graph Drawing Symposium in Irvine, California. The purpose of the contest is to monitor and challenge the current state of the graph-drawing technology.

1 Introduction

The contest had two categories, two so-called "challenge graphs" and a new interactive graph analysis, which replaced the former artistic category. The challenge graphs were open to everyone in and outside the graph drawing community. The requirements were drawings in printable from and a description of the drawing procedure. The interactive graph analysis was initiated by Joe Marks and Sue Whitesides, who also designed the two query graphs for this category. It was directed to the participants of the symposium.

Text descriptions for the 2002 contest were available via the World Wide Web (WWW) and announced with the Graph Drawing Symposium. The data on the graphs was provided in GML format.

However, only four submissions from three teams were received on the challenge graphs, and the participants at the symposium were not well prepared for the interactive test. The entries for graph A, the "Knowledge Nation Graph", realize similar ideas and introduce some innovative concepts from graph drawing into the representation of the Knowledge Nation Graph. However, the created drawings are not yet capable to visualize this graph in all its aspects. For graph B it has turned out that spring embedders perform quite well on this graph and display it like a crown, although its hidden structure is not displayed by these methods.

All four submissions were nominated as winners of the same grade.

2 Winning Submissions

2.1 Category A

The graph for Category A is the "Knowledge Nation Graph". Its original drawing is shown in Fig. 1. For more information on the graph and its story see http://www.cs.usyd.edu.au/~visual/library/. The Knowledge Nation Graph has been proposed by Carsten Friedrich from the University of Sydney.

M.T. Goodrich and S.G. Kobourov (Eds.): GD 2002, LNCS 2528, pp. 376–379, 2002.

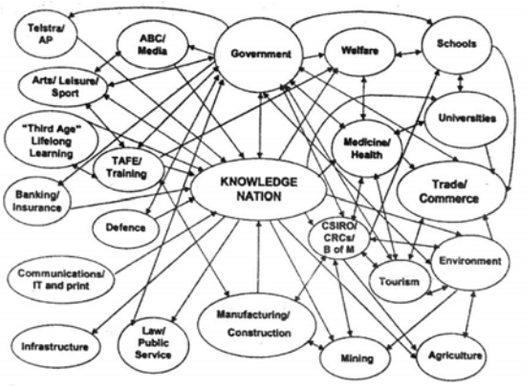


Fig. 1. The "Knowledge Nation Graph"

From a graph theoretic view it has 23 nodes and 59 edges. Two nodes, "Government" and "Knowledge Nation" are dominant, and are connected to almost all other nodes. The entry by Daniel Gmach, Paul Holleis, and Thomas Zimmermann, students at the University of Passau, places the Government node near the center and displays the Knowledge Nation as the outer frame, see Fig. 2. So the dominance of these nodes is reflected. The frame reduces the visual complexity. However, the drawing is hard to read and has too many crossings. The drawing was made using Graphlet.

The entry by Nikola S. Nikolov and Patrick Healey from the University of Limerick is a two step approach. First the graph is partitioned into the cue map, which is obtained by selecting the two highest degree nodes Government and Knowledge Nation and adding the then isolated nodes. The remaining nodes are grouped into black, grey and white nodes representing out-, in- and non-

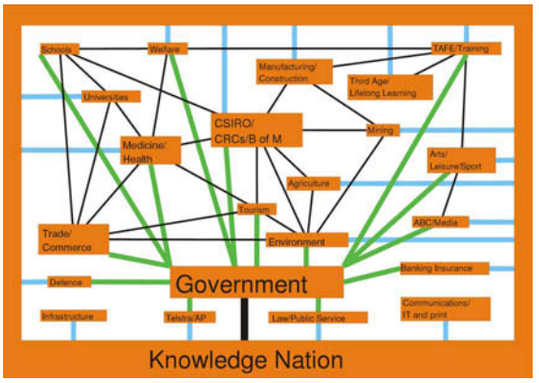
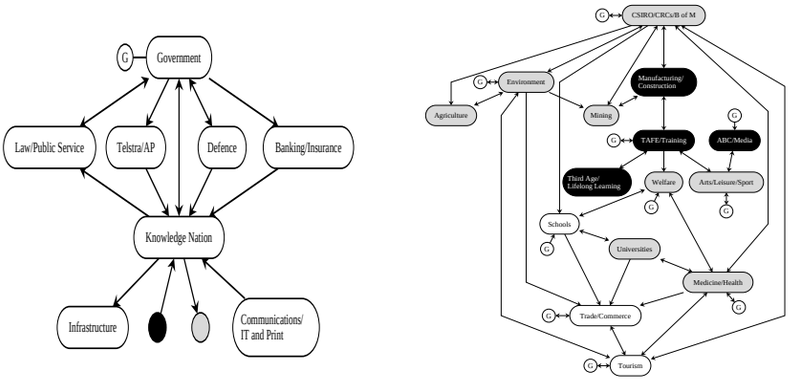


Fig. 2. Entry of Gmach, Holleis, and Zimmermann



(a) Cue Map (b) Main Map

Fig. 3. Entry of Nikolov and Healey

neighbours of the Knowlegde Nation node. The black and the grey clusters are represented by single nodes. The main map is obtained from the remaining nodes and copies of the Government node for each incident edge. The drawings of the graphs are shown in Fig. 3(a) and 3(b) and were made by a customized Sugiyama algorithm.

2.2 Category B

Graph B represents a gadget from an NP-reduction. There are two parallel paths such that the remaining edges connect nodes on either path. Aesthetically pleasing and almost identical drawings are obtained by spring embedders. This has been discovered by Daniel Gmach, Paul Holleis, and Thomas Zimmermann, students of the University of Passau, using the Kamada-Kawai algorithm and the constraint spring embedder from Graphlet (see Fig. 4) and by Christoph Vogt, student of the University of Cologne, using his implementation of the GEM algorithm (see Fig. 5).

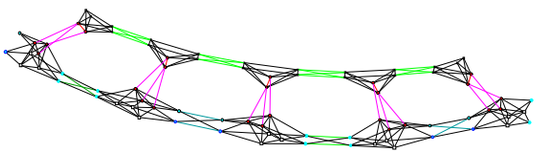


Fig. 4. Entry of Gmach, Holleis, and Zimmermann for Category B

Fig. 5. Entry of Vogt for Category B

2.3 Category C

In the previous graph drawing contests the emphasis has been on the production of graph drawings that could be used to support a variety of unspecified visualization or analysis tasks. In this part of the contest the analysis part was made explicit, requiring contestants to conduct interactive graph analysis in real time and hoping that this contest task would inspire new research into graph drawing and graph analysis methods.

Since the competitors were not prepared for the contest it will be repeated at the 11th Graph Drawing Symposium 2003.

2.4 Conclusion

The response on the Graph Grawing Contest has declined over the past years. To encourage submissions for the 10th Graph Drawing Contest in 2003 it is anticipated to increase the prize money to $ 1000 for the winner of the challenge graph category, and to $ 500 in the interactive category.

Acknowledgement

I wish to thank Carsten Friedrich, University of Sydney for providing the "Knowledge Nation Graph" and Joe Marks, MERL, Cambridge and Sue Whitesides, Mc Gill University, Montreal, for introducing and preparing Category C.

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