Graph-Drawing Contest Report

Christian A. Duncan¹, Stephen G. Kobourov², and Dorothea Wagner³

¹ University of Miami, Coral Gables, FL 33124, USA
duncan@cs.miami.edu

² University of Arizona, Tucson, AZ 85721, USA
kobourov@cs.arizona.edu

³ Karlsruhe University, 76128 Karlsruhe, Germany
dwagner@ira.uka.de

Abstract. This report describes the Twelfth Annual Graph Drawing Contest, held in conjunction with the 2005 Graph Drawing Symposium in Limerick, Ireland. The purpose of the contest is to monitor and challenge the current state of graph-drawing technology.

1 Introduction

This year's graph drawing contest had three distinct tracks: the graph drawing challenge, the evolving graph contest, and the free-style contest. The graph drawing challenge took place during the conference. The challenge was straight-line crossing minimization of 6 graphs with 20-100 vertices. The contestants were given one hour and were free to use custom designed software or a provided program for manual graph editing, GraphMan. The evolving graph contest asked for visualizations, including animations and static images of the Internet Movie Database graph, emphasizing the evolving nature of the data. The free-style submission offered the opportunity for participants to present their best graph visualizations. Eight teams of one to three participants submitted graphs to the challenge. There were four submissions to the evolving graph contest and five submissions to the free-style contest.

2 Graph Drawing Challenge

Submissions to the challenge were measured by assigning scores between 0 and 6 to each participating team as follows: each of the six submitted graphs G_i was assigned a score: $s_i = \frac{\min_i}{\text{cur}_i}$, where $\min_i$ was the minimal number of crossings found for the i -th graph and cur_i was the number of crossings in G_i . The individual scores for the six graphs were added to obtain the total score for each team. The contest committee awarded one first prize and three honorable mentions.

The first place winner was the team of Markus Chimani, Carsten Gutwenger and Karsten Klein using a custom made tool, **grapla**. The **grapla** tool was written by Andrei Grecu from Vienna University of Technology and was also used by last year's winning team. Three honorable mentions were given to Daniel Stefankovic, Michael Bennett, and the team of Michael Spriggs and Josh Liason. The first two used a combination approach of automated and manual crossing minimization, while the last used only the GraphMan graph editor.

3 Evolving Graph Contest

Four submissions for the evolving graph contest were received. The submissions consisted of papers, animations, SVG-files, and static images. The contest committee awarded first prize to Vlado Batagelj, Andrej Mrvar, Adel Ahmed, Xiuyan Fu, Seokhee Hong, and Damian Merrick for their submission “Some Approaches to the Analysis and Visualization of the Internet Movie Database.” They used (p, q) -cores, 4-rings, islands and time slices to extract interesting subnetworks of the Internet Movie Database. The densest such cores came from wrestling and adult movies, and some of the islands showed famous series like Charlie Brown, Starkes Team and Doña Macabra. Two visualizations were produced that showed the evolution of collaboration between Hollywood actors, musicians and even presidents, through animated transitions between force-directed layouts. Nodes and edges were assigned sizes and colors according to their relative importance in the graph; see Fig. 1.

Honorable mention was given to Ulrik Brandes, Martin Hoefer, and Christian Pick for their submission “Dynamic Egocentric Layout of Actor Biographies.” It consisted of a dynamic visualization of the collaboration and work biography of a single actor, using the collaboration subgraph of that actor. The layouts were generated by implicitly placing the chosen actor in the middle of the drawing, while movies starring the actor were placed on annual rings that moved outwards. Collaborating actors were placed relative to the existing elements with sizes and

Fig. 1. Snapshot from the winning submission of the evolving graph contest

Fig. 2. Snapshot from the submission by Brandes *et al*

positions varying based on importance, age, and structural connectivity; see Fig. 2 for an example using the actor Val Kilmer.

Honorable mention was also given to Michael Baur, Marco Gaertler, and Robert Görke for their submission “Analyzing the Career of Actors (How to Become Famous Fast).” The submission was a Java3D application allowing interactive exploration of the migration of actors through different genres. Combining the genre paths of all actors in the database offers insight into the overall genre migration with an abstracted genre-time graph in space. The nodes and edges of their graph represent different genres at different points in time and migrations of actors between them, respectively. The graph is wrapped around a cylinder, where one axis represents time and the others the different genres; landmarks corresponding to particular movies are also used for ease of navigation; see Fig 3.

4 Free-Style Contest

Five submissions for the free-style category were received. The submissions consisted of individual drawings, SVG files, papers, and movies. The contest committee awarded first prize to Marco Gaertler and Markus Krug for their submission “Flying Through a Graph’s Spectrum.”

Spectral embeddings offer analytic insight into graph structure, e.g., revealing symmetries. However, traditional representation media restricts spectral embeddings to two or three dimensions. The submission consisted of animations,

Fig. 3. Snapshot from the submission by Baur *et al*

Fig. 4. Snapshot from the winning submission in the free-style contest

where layouts induced by different eigenvectors were morphed into each other. The animation showed many different embeddings in a short time, while offering aesthetically pleasing views. Fig. 4 shows four snapshots of the animation using a path with 100 nodes.

Acknowledgments

We would like to thank Intel and Dell for sponsoring the awards for the contest. We would also like to thank the organizers and all of the contestants for making this another successful contest.