Special Issue on Selected Papers from the Tenth International Symposium on Graph Drawing, GD 2002

Guest Editor's Foreword

Xin He

Department of Computer Science and Engineering
University at Buffalo
http://www.cse.buffalo.edu/∼xinhe
xinhe@cse.buffalo.edu

This special issue brings together selected papers from the *Tenth International Symposium on Graph Drawing*, which was held in Irvine California, on August 26–28, 2002. I invited the strongest papers in the ratings generated by GD program committee and I am happy that the following five papers are included into this special issue after a thorough refereeing process.

The straight-line drawing of binary trees on a plane grid is a classical problem in graph drawing. The paper "Straight-line Drawings of Binary Trees with Linear Area and Arbitrary Aspect Ratio," by A. Garg and A. Rusu, presents an $O(n \log n)$ time algorithm that given a binary tree T with n vertices, constructs a planar straight-line grid drawing of T with area $O(n)$ and any specified aspect ratio in the range $[n^{-\epsilon}, n^{\epsilon}]$ for any constant ϵ ($0 < \epsilon < 1$). This results shows that optimal $O(n)$ area and optimal aspect ratio (equal to 1) are simultaneously achievable for such drawings.

Two papers in this special issue are related to the drawing styles where the vertices of an input graph G are drawn on two or three straight lines. The first paper, "Drawing Graphs on Two and Three Lines," by S. Cornelsen, T. Schank and D. Wagner, discusses algorithms that decide if G has a planar drawing on two or three lines. The second paper, "Simple and Efficient Bilayer Cross Counting," by W. Barth, P. Mutzel and M. Jünger, presents simple algorithms for counting the number of edge crossings in such drawings on two straight lines.

The paper "Graph Drawing by High-Dimensional Embedding," by D. Harel and Y. Koren, presents a novel approach to aesthetic drawing of undirected graphs. First, embed the graph in a very high dimension space, then project it into the 2-D plane. Experiments show that the new approach has several advantages over classical methods.

The paper "Computing and Drawing Isomorphic Subgraphs," by S. Bachl, F.-J. Brandenburg, and D. Gmach, discusses the isomorphic subgraph problem. It is shown that the problem is NP-hard even for restricted instances, such as connected outerplanar graphs. The paper also presents a spring algorithm which preserves isomorphic subgraphs and displays them as copies of each other.

This special issue illustrates the diversity of the graph drawing field. The topics of the papers range from classical graph drawing problems, new approaches of drawing algorithms, to simplified graph-theoretic algorithms and their applications in graph drawing.