GUEST EDITORIAL

Special Section on Visualization and Data Analysis

Robert F. Erbacher
University at Albany, State University of New York
Department of Computer Science
Albany, New York 12222

Alex Pang
University of California, Santa Cruz
Computer Science Department
Santa Cruz, California 95064

This special section in the *Journal of Electronic Imaging* presents eight select papers from the field of visualization out of 24 papers submitted for consideration. This special section is an outgrowth of the SPIE Conference on Visual Data Exploration and Analysis that we have been fortunate enough to have been involved with over the past several years. This is an opportune time for a special section of Visualization and Data Analysis. The quality of the papers being presented at the sister conference is improving in quality and breadth. Visualization is becoming ever more valuable to aid in the analysis of information. Electronic imaging systems in particular are collecting enormous amounts of data on a daily basis. Only through the development of novel techniques, such as those presented here, will we be able to fully explore these data sets, identify their underlying character, and expose hidden phenomena. We hope that the selection of papers presented here provides a small indication of what is possible with visualization and related analysis techniques. With the exposure provided here we can only hope that more of you involved in electronic imaging will choose to explore the applicability of visualization to your application domain.

The papers chosen for publication cover a broad range of topics, from scientific and information visualization to data mining applications and colorimetry. We hope the broad range of visualization applications represented here will motivate more researchers to report and share their results, as well as to take advantage of the research results presented here.

The first paper by Scheuermann *et al.* present an algorithm for extracting local topological structure from a two-dimensional (2D) flow field, which is then visualized using vector fields. In the second paper, Lakshminarayana and Newman present a 3D visualization metaphor for the representation of design phase object-oriented software metrics. Anyone who has been involved in large-scale software development projects will see the value in the presented techniques. In the third paper, Berchtold, Jagadish, and Ross present a novel technique for representing data dependencies that is less susceptible to outliers and more effectively denotes the constituent dependencies. Nonato, Minghim, and Shimabukuro compare two techniques for reconstructing 3D representations of tooth models for analysis. The first algorithm is based on distance sampling and the second is derived from Delaunay Triangulation.

The fifth paper, by Chi *et al.*, presents their comb glyph technique and associated environment for visually representing similarities and differences between a given DNA sequence and a database of representative sequences. The next paper, by Han and Cercone, describes their environment and techniques for visualizing data mining applications showing all stages of the data mining process. This renders greater understanding as to the knowledge behind a visual representation than just providing a final resultant display as is currently provided by most environments. Paquet, Robinette, and Rioux describe their environment that automatically collects information related to 3D and anthropomorphic databases and indexes them based on information concerning shape, scale, and color distribution. The environment assists in the cataloging of large libraries of models providing increased manageability and usefulness. Finally, Chang and Chen propose a colorimetric modeling technique that provides more accurate color representation than current models. The goal is to use this model in imaging and vision systems to more accurately produce desired colors.

We could not have succeeded in putting this special section together were it not for the reviewers who volunteered their time and put in enormous effort to ensure that only the best, highest quality papers were accepted for publication. We would like to give special thanks to these individuals and their contribution to the success of this special section.

Finally, we would like to thank the authors for the time and effort they put into their papers and their quick turn around in getting their revised papers submitted. We are confident you will find the enclosed papers enjoyable and enlightening. We look forward to seeing additional contributions to the field in the future.

Robert F. Erbacher received his BS degree in computer science from The University of Lowell in 1991. He received his MS and ScD degrees in computer science from the University of Massachusetts-Lowell in 1993 and 1998, respectively. He joined the Department of Computer Science at The University at Albany-SUNY as an assistant professor in 1999 after spending a year at The University of Idaho as a visiting professor. From 1990 to 1998 he was a researcher with the Institute for Visualization and Perception Research at the University of Massachusetts-Lowell. From 1994 to 1997 he worked on virtual reality at The MITRE Corporation. He is currently an associate editor for the *Journal of Electronic Imaging*, chair of the SPIE Conference on Visual Data Exploration and Analysis, and a member of the Program Committee for the IEEE Visualization Conference. He is a member of the IEEE and ACM. His current research interests include computer graphics, information visualization, virtual reality, concurrent processing, program debugging, and interactive computational steering. http://www.cs.albany.edu/~erbacher.

Alex Pang is an associate professor at the University of California at Santa Cruz. He received his MS and PhD degrees in computer science from UCLA in 1984 and 1990, respectively. His current research interests include uncertainty visualization, collaborative visualization, vector and tensor field visualization, and novel devices and interaction techniques for scientific visualization. http://www.cse.ucsc.edu/~pang.