Handbook of Human Centric Visualization

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Editor

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Foreword by Peter Eades

Springer

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Foreword

Visualization research promises to help humans to explore and comprehend information, thus making vast stores of data useful to humankind.

Much of this visualization research follows a simple pattern: (1) "here is an important data set," (2) "here is a picture of this data set," (3) "wow, the picture looks cool!"

Huang's book does contain some of the world's coolest pictures of data. But the book goes further: it considers the much deeper questions of *how* humans read visualizations, and *why* we use visualization. The very nature of visualization is examined. Visualization is not just a technology; it is a human communication mechanism.

In particular, the question of what kind of scientific methodology should be used to evaluate visualizations is considered in detail.

Such topics are beyond the gamut of Computer Science, and can only be answered by a multidisciplinary approach. The book has chapters written by researchers in a variety of disciplines, from psychology to business, from philosophy to engineering.

The book is revolutionary in its scale and breadth.

Peter Eades
September 3, 2012.

Preface

We visualize data for human appreciation and understanding. In other words, all visualizations are meant to be human centric. However, human centric visualizations do not come automatically.

To ensure that a visualization is human centric, we need proper theories and principles to guide the process of the visualization design. Once the visualization is produced, we need methods and measures to verify whether the design objectives are indeed achieved. Rapid advances in display technology and computer power have enabled researchers and practitioners to produce visually appealing pictures. However, the effectiveness of those pictures in conveying the embedded information to end users has been relatively less explored.

Handbook of Human Centric Visualization aims to contribute to the human side of the visualization research. It addresses issues related to design, evaluation, and application of visualizations. Topics include visualization theories, design principles, evaluation methods and metrics, human factors, interaction methods, and case studies. This cutting-edge book is an edited volume whose contributors include well-established researchers worldwide, from diverse disciplines including psychology, education, visualization, and human-computer interaction.

This book consists of twenty-nine chapters, which are grouped into the following seven parts:

I. Visual Communication
II. Theory and Science
III. Principles, Guidelines, and Recommendations
IV. Methods
V. Perception and Cognition
VI. Dynamic Visualization
VII. Interaction

The main features of this book can be summarized as follows:

1. Provides a comprehensive overview of human centric visualization
2. Represents latest developments and current trends in the field

3. Presents visualization theories
4. Covers design principles and guidelines
5. Presents evaluation methodologies and case studies
6. Includes contributions from leading experts and active researchers from a range of disciplines

This book is designed for a professional audience composed of practitioners, lecturers, and researchers working in the field of computer graphics, visualization, human-computer interaction and psychology. Undergraduate and postgraduate students in science and engineering focused on this topic will also find this book useful as a comprehensive textbook or reference.

Weidong Huang

Editorial Board

Acknowledgement

I wish to thank all authors who submitted their valuable work for consideration. Without their effort and contribution, this book would not have been possible. I received 84 exciting chapter proposals in total covering almost every aspect of human centric visualization. Unfortunately, due to limitations on the size of the book and the range of topics to be addressed, many good proposals were not considered further.

I thank our valued members of the International Advisory Editorial Board. Their world class reputation and generous support for this project have helped to attract the high-quality submissions and receive the overwhelming responses from the wide scientific community.

Editing a book like this is a time-consuming and sometimes lonely process. However, throughout this process, I have consistently received positive feedback and support from many individuals. Some recommended potential authors. Some helped or offered to help in shaping the book. All this has helped to keep my spirits high throughout the project. I thank them all. I would also like to extend my special thanks to Chaomei Chen, Jian Chen, Mary Czerwinski, Andreas Kerren, Stephen Kosslyn, Fred Paas, Helen Purchase, Barbara Tversky, Jack van Wijk, and Kang Zhang for their help in one way or another.

I thank Professor Peter Eades for writing the foreword.

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