

CONTENTS

INTRODUCTION	1
We Have an Information Problem / 1	
The Solution Isn't Complicated / 2	
Traditional Software Has Hit the Wall / 3	
We Must Use Our Eyes / 6	
We Must Keep Our Focus on the Goal / 7	
The Approach of this Book / 7	
 PART I BUILDING CORE SKILLS FOR VISUAL ANALYSIS	 9
<i>General Concepts, Principles, and Practices</i>	
 1. INFORMATION VISUALIZATION	 11
Meanings and Uses of the Term "Visualization" / 12	
A Brief History of Information Visualization / 13	
 2. PREREQUISITES FOR ENLIGHTENING ANALYSIS	 19
Aptitudes and Attitudes of Effective Analysts / 19	
Traits of Meaningful Data / 24	
 3. THINKING WITH OUR EYES	 29
The Power of Visual Perception / 30	
How Visual Perception Works / 32	
Using Knowledge of Perception to Create Effective Visualizations / 33	
Making Abstract Data Visible / 36	
Overcoming the Limits of Memory / 49	
The Building Blocks of Information Visualization / 53	
 4. ANALYTICAL INTERACTION AND NAVIGATION	 55
Analytical Interaction / 55	
Analytical Navigation / 82	
 5. ANALYTICAL TECHNIQUES AND PRACTICES	 93
Optimal Quantitative Scales / 93	
Reference Lines and Regions / 96	
Trellises and Crosstabs / 98	
Multiple Concurrent Views and Brushing / 104	
Focus and Context Together / 113	
Details on Demand / 116	
Over-plotting Reduction / 117	

6. ANALYTICAL PATTERNS	127
Guidelines for Representing Quantitative Data / 128	
In the Smooth and in the Rough / 134	
Pattern Examples / 136	
Beware of Patterns that Aren't Actually There / 139	

PART II HONING SKILLS FOR DIVERSE TYPES OF VISUAL ANALYSIS 141
Specific Patterns, Displays, and Techniques

7. TIME-SERIES ANALYSIS	143
Introduction / 143	
Time-series Patterns / 143	
Time-series Displays / 150	
Time-series Analysis Techniques and Best Practices / 162	

8. PART-TO-WHOLE AND RANKING ANALYSIS	189
Introduction / 189	
Part-to-Whole and Ranking Patterns / 190	
Part-to-Whole and Ranking Displays / 191	
Part-to-Whole and Ranking Techniques and Best Practices / 194	

9. DEVIATION ANALYSIS	203
Introduction / 203	
Deviation Analysis Displays / 204	
Deviation Analysis Techniques and Best Practices / 208	

10. DISTRIBUTION ANALYSIS	211
Introduction / 211	
Describing Distributions / 214	
Distribution Patterns / 219	
Distribution Displays / 224	
Distribution Analysis Techniques and Best Practices / 240	

11. CORRELATION ANALYSIS	245
Introduction / 245	
Describing Correlations / 247	
Correlation Patterns / 251	
Correlation Displays / 260	
Correlation Analysis Techniques and Best Practices / 266	

12. MULTIVARIATE ANALYSIS	281
Introduction / 281	
Multivariate Patterns / 282	
Multivariate Displays / 282	
Multivariate Analysis Techniques and Best Practices / 291	

PART III FURTHER THOUGHTS AND HOPES	295
13. PROMISING TRENDS IN INFORMATION VISUALIZATION	297
Built-in Best Practices /	297
Integrated Support for Geo-spatial Analysis /	298
Integrated Support for Network Analysis /	302
Integrated Support for Collaborative Analysis /	304
Custom Analytical Applications /	307
Illuminating Predictive Models /	308
Integrated Data Mining /	311
Improved Human-Computer Interface Devices /	311
14. WISDOM IN THE AGE OF INFORMATION	313
APPENDICES	315
Appendix A: Expressing Time as a Percentage in Excel /	315
Appendix B: Adjusting for Inflation in Excel /	317
BIBLIOGRAPHY	319
INDEX	323