

Preface to Third Edition

Who Is the Book For?

Despite conventional – and misplaced – views about information visualization, this book is *not* targeted solely at computer science students: visualization basically has nothing to do with computer science¹ and is far too powerful and important to so many disciplines for it to be confined to such a small audience. Rather, the book is intended as an introduction to information visualization for first year (or later) students of *any* discipline, be it medicine, marketing, geology, security or demographics. Those students may be encountering the subject in their first university year or, following a Masters degree in any subject, they may be training to be visual and interaction designers. In fact, the book material has been extensively tested through presentation to many such students in the UK, The Netherlands, Portugal and elsewhere. For the same reason it does not attempt to bring you the latest results of research, though it remains topical and even looks ahead at what might be possible.

What's New?

In one sense, nothing. As in the second edition, the structure of the book can be represented by a ‘Tube-like’ model (Fig. P1) emphasizing three principal topics – representation, presentation and interaction – and reflecting the generally accepted ‘reference model’ of the information visualization process (Fig. P2). But the content of each of these principal chapters has undergone major revision.

¹A provocative statement indeed, but one made (1) in full appreciation of the enormous benefits than can accrue from computation, and (2) to emphasise that visualization is essentially – and by definition – the formation of a mental model of something.

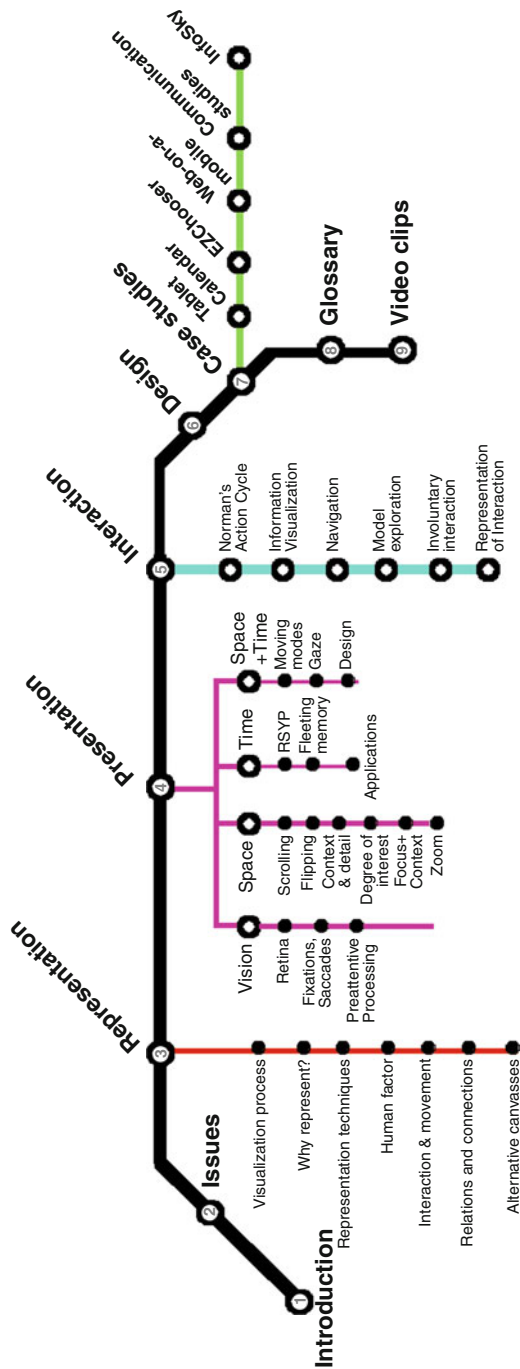


Fig. P1 The structure of the book

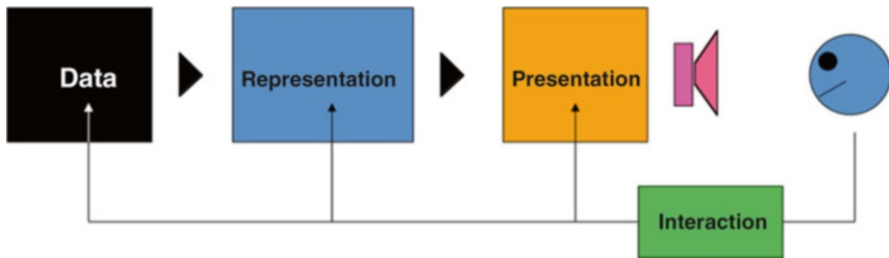


Fig. P2 The reference model of the information visualization process. The representation, presentation and interaction processes are the subjects of the principal Chaps. 3, 4 and 5 of the book. Consideration of the human user, pictured at *right*, proceeds throughout the book

The material on representation has been given a structure that will hopefully lead to better understanding. Presentation has been addressed by recognising three principal resources available to the designer: the human visual system, the constraints and freedoms associated with display space, and considerations of the time allocated to a task. The chapter on interaction has been completely rewritten. Although many researchers are seeking a science of interaction they have not yet found it, so I have adopted Norman’s Cycle of Interaction for the powerful structure and guidance that it offers to those who have to design interactive systems.

Human Performance

Many visualization tools are proposed without much, if any, recognition of the fact that they are basically there to support a human activity – the formation of a mental model of something (i.e., visualization) or, put another way, making sense of data. What I have tried to do is distil, from the vast existing (and incomplete) knowledge of human perception and cognition, those aspects that are principally relevant to a user’s attempts to form a mental model of some data. And I have tried to illustrate by practical examples *why* that distilled knowledge is relevant.

Creative Design

Two beliefs direct my teaching and are reflected in the book. First, I believe that the best way to gain an understanding of human-computer interaction, and information visualization in particular, is to *do it*. I decline to set end-of-term examination papers; I feel it is far more effective pedagogically to ask my students to undertake design exercises of varying complexity, ending with a substantial group project. Second, I focus on creative design, and certainly not on implementation: you will

find no exercises beginning “Write a program for . . .”. Consistent with these ideals I try to place my design projects in a realistic setting. Thus, the group project that terminates a course treats each small group of students as a design consultancy working on a commission from a client, ending with an oral and written presentation to that client. The enthusiasm generated by this opportunity to be creative and imaginative is apparent from the feedback I receive.

Teaching Resources

For many years I have made the powerpoint files and other materials I employ in my teaching freely available to teachers, and will continue to do so (just contact me at r.spence@imperial.ac.uk).

Visual Analytics

Experts in information visualization will no doubt wonder how I have addressed the “new” topic of visual analytics. I haven’t or, rather, I have briefly discussed the *context* of information visualization in Chap. 1 (Introduction) and provided two illustrative examples of what would be termed visual analytics. There is one principal reason: the book is intended as an *introduction* to information visualization, and there is plenty of material to absorb and experience, in a typical course, with just that single end in view. In any case, I am sure that a competent instructor will be able, if they wish, to introduce a flavour of visual analytics, perhaps without even mentioning it by name. Certainly, following an introductory course on information visualization there are many pedagogical paths that would introduce visual analytics, but it is certainly not for me to prescribe one that should be followed.

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