国外计算机科学教材系列

PEARSON

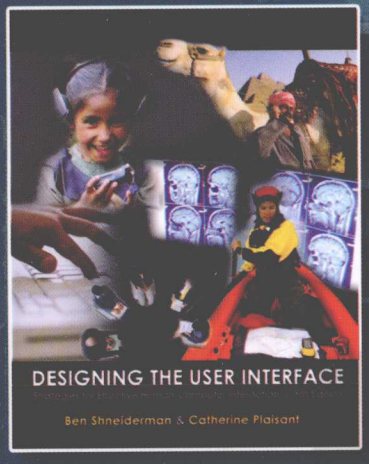
用户界面设计

——有效的人机交互策略（第五版）

Designing the User Interface

Strategies for Effective Human-Computer Interaction

Fifth Edition



英文版

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（英文版）

電子工業出版社
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内容简介

本书为了适应因特网和各种移动设备迅猛发展的形势，在第四版的基础上始终以基于Web、桌面和移动设备的设计作为内容主线。新的设计实例涉及电子商务、在线社区、电子政府、图片管理、购物、交通、游戏和移动电话，选材新颖实用，切合目前的应用实际。同时，新版本扩展了社会媒体参与和用户生成内容的介绍，代表了人机交互著作的主流发展趋势。

本书面向的读者极为广泛，具有计算机科学、心理学、社会学、工业工程学、信息科学、信息研究、信息系统、商业、教育和通信知识背景的读者，都可以在本书中发现新鲜的、有价值的信息。

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出 版 说 明

21世纪初的5至10年是我国国民经济和社会发展的重要时期，也是信息产业快速发展的关键时期。在我国加入WTO后的今天，培养一支适应国际化竞争的一流IT人才队伍是我国高等教育的重要任务之一。信息科学和技术方面人才的优劣与多寡，是我国面对国际竞争时成败的关键因素。

当前，正值我国高等教育特别是信息科学领域的教育调整、变革的重大时期，为使我国教育体制与国际化接轨，有条件的高等院校正在为某些信息学科和技术课程使用国外优秀教材和优秀原版教材，以使我国在计算机教学上尽快赶上国际先进水平。

电子工业出版社秉承多年来引进国外优秀图书的经验，翻译出版了“国外计算机科学教材系列”丛书，这套教材覆盖学科范围广、领域宽、层次多，既有本科专业课程教材，也有研究生课程教材，以适应不同院系、不同专业、不同层次的师生对教材的需求，广大师生可自由选择和自由组合使用。这些教材涉及的学科方向包括网络与通信、操作系统、计算机组织与结构、算法与数据结构、数据库与信息处理、编程语言、图形图像与多媒体、软件工程等。同时，我们也适当引进了一些优秀英文原版教材，本着翻译版本和英文原版并重的原则，对重点图书既提供英文原版又提供相应的翻译版本。

在图书选题上，我们大都选择国外著名出版公司出版的高校教材，如Pearson Education培生教育出版集团、麦格劳－希尔教育出版集团、麻省理工学院出版社、剑桥大学出版社等。撰写教材的许多作者都是蜚声世界的教授、学者，如道格拉斯·科默（Douglas E. Comer）、威廉·斯托林斯（William Stallings）、哈维·戴特尔（Harvey M. Deitel）、尤利斯·布莱克（Uyless Black）等。

为确保教材的选题质量和翻译质量，我们约请了清华大学、北京大学、北京航空航天大学、复旦大学、上海交通大学、南京大学、浙江大学、哈尔滨工业大学、华中科技大学、西安交通大学、国防科学技术大学、解放军理工大学等著名高校的教授和骨干教师参与了本系列教材的选题、翻译和审校工作。他们中既有讲授同类教材的骨干教师、博士，也有积累了几十年教学经验的老教授和博士生导师。

在该系列教材的选题、翻译和编辑加工过程中，为提高教材质量，我们做了大量细致的工作，包括对所选教材进行全面论证；选择编辑时力求达到专业对口；对排版、印制质量进行严格把关。对于英文教材中出现的错误，我们通过与作者联络和网上下载勘误表等方式，逐一进行了修订。

此外，我们还将与国外著名出版公司合作，提供一些教材的教学支持资料，希望能为授课老师提供帮助。今后，我们将继续加强与各高校教师的密切联系，为广大师生引进更多的国外优秀教材和参考书，为我国计算机科学教学体系与国际教学体系的接轨做出努力。

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DESIGNING THE USER INTERFACE

To Jenny and Peter;
Anna, Sara, and Thomas

Preface

Designing the User Interface is written for students, researchers, designers, managers, and evaluators of interactive systems. It presents a broad survey of how to develop high-quality user interfaces for interactive systems. Readers with backgrounds in computer science, psychology, sociology, industrial engineering, information science/studies/systems, business, education, and communications should all find fresh and valuable material. Our goals are to encourage greater attention to usability issues and to promote further scientific study of human-computer interaction, including the rapidly emerging topic of social media participation.

Since the publication of the first four editions of this book in 1986, 1992, 1998, and 2005, HCI practitioners and researchers have grown more numerous and influential. The quality of interfaces has improved greatly, while the community of users and its diversity have grown dramatically. Researchers and designers could claim success, but today user expectations are higher, applications are more demanding, and platforms are more varied. In addition to desktop computers, designers now must accommodate web-based services and an increasingly diverse set of mobile devices. User interface designers are moving in new directions: some innovators provoke us with virtual and augmented realities, whereas others offer alluring scenarios for ubiquitous computing, embedded devices, and tangible user interfaces.

These innovations are important, but much work remains to be done to improve the experiences of novice and expert users who still struggle with too many frustrations. These problems must be resolved if we are to achieve the goal of universal usability, enabling all citizens in every country to enjoy the benefits of these new technologies. This book is meant to inspire students, guide designers, and provoke researchers to seek those solutions.

Keeping up with the innovations in human-computer interaction is a demanding task, and requests for an update begin arriving soon after the publication of each edition. The expansion of the field led the single author of the first three editions, Ben Shneiderman, to turn to Catherine Plaisant, a long-time valued research partner, for coauthoring help with the fourth and fifth editions. In addition, two contributing authors lent their able support to this fifth edition: Maxine S. Cohen and Steven M. Jacobs have long experience teaching with earlier editions of the book and provided fresh perspectives that improved the quality for all readers and instructors. In preparing for this edition, we harvested information from books and journals, scanned the World Wide Web,

attended conferences, and consulted with colleagues. Then we returned to our keyboards to write, producing first drafts that served as a starting point to generate feedback from colleagues, HCI practitioners, and students. The work that went into the final product was intense, but satisfying. We hope you, the readers, will put these ideas to good use and produce more innovations for us to report in future editions.

New in the Fifth Edition

Readers will see the dynamism of human-computer interaction reflected in the substantial changes to this fifth edition. The good news is that most universities now offer courses in this area, and some require it in computer science, information schools (iSchools), or other disciplines. Courses and degree programs in human-computer interaction, human-centered computing, interaction design, etc. are a growing worldwide phenomenon at every educational level. Although many usability practitioners must still fight to be heard, corporate and government commitments to usability engineering grow stronger daily. The business case for usability has been made repeatedly, and dedicated web sites describe scores of studies demonstrating strong return on investment for usability efforts.

Comments from instructors who used the previous editions were influential in our revisions. The main change was to dramatically expand our coverage of social media participation and user-generated content, especially from mobile devices. We deleted the chapter on software tools, as these change so rapidly and deserve more attention than we could give them in a single chapter. Every remaining chapter has been updated with fresh ideas, examples, figures, and references. At the same time, some topics have become less relevant; they, together with older references, have been removed.

The opening chapter addresses the growing issue of ensuring universal usability for increasingly diverse users of interactive systems. The second chapter presents design guidelines, principles, and theories that have been substantially updated to reflect new ways of thinking. Part 2 covers refinements to development methodologies and evaluation techniques. Part 3 explores progress in direct manipulation and its extensions such as virtual and augmented reality, as well as changes to menus, form fill-in, and command languages brought about by the new platforms (especially mobile devices). Since collaboration and social media participation have become so central, the final chapter in this part of the book has been heavily expanded and updated. Part 4 emphasizes Quality of Service and a series of important design issues. Chapter 12 has been thoroughly revised to reflect the vitality of user documentation and

online help in serving the goal of universal usability. Finally, information search and visualization now have their own chapters, since we believe that these topics have grown dramatically in importance.

We strive to give balanced presentations on controversial topics such as 3D, speech, and natural-language interfaces. Philosophical controversies such as the degree of human control and the role of animated characters are treated carefully to present fairly the viewpoints that differ from our own. We gave colleagues a chance to comment on these sections and made a special effort to provide a balanced presentation while making our own opinions clear, especially in the Afterword. Readers will have to judge for themselves whether we succeeded.

Instructors wanted guidelines and summary tables; these elements are shown in boxes throughout the book. The Practitioner Summaries and Researcher Agendas remain popular; they have been updated. The references have been expanded and freshened with many new sources, with classic papers still included. We worked hard to select references that were widely available and often web-accessible. Figures, especially those showing screen designs, age quickly, so many new user interfaces are shown. Printing in full color makes these figures valuable as a record of contemporary design styles.

Ways to Use This Book

We hope that practitioners and researchers who read this book will want to keep it on their shelves to consult when they are working on new topics or seeking pointers to the literature.

Instructors may choose to assign the full text in the order that we present it or to make selections from it. The opening chapter is a good starting point for most students, but instructors may take different paths depending on their disciplines. For example, instructors might emphasize the following chapters, listed by area:

- Computer science: 2, 5, 6, 7, 8, 9, 10, 13, 14
- Psychology and sociology: 2, 4, 5, 9, 10, 11, 12
- Industrial engineering: 2, 4, 5, 10, 11, 13, 14
- Library and information studies: 2, 4, 9, 11, 12, 13, 14
- Business and information systems: 3, 4, 5, 9, 10, 12, 13, 14
- Education technology: 2, 4, 9, 12, 13, 14
- Communication arts and media studies: 4, 5, 9, 11, 12
- Technical writing and graphic design: 3, 4, 5, 11, 12

Companion Website (www.aw.com/DTUI)

The presence of the World Wide Web has a profound effect on researchers, designers, educators, and students. We want to encourage intense use of the Web by members of all these groups, but the volatility of the Web is not in harmony with the permanence of printed books. Publishing numerous web site URLs in the book would have been risky, because changes are made daily. For these and other reasons, we have established a Companion Website to accompany this book. We hope that every reader will visit the site, and that you will not hesitate to send us ideas for improving it.

In addition to pointers to current web resources, a variety of supplemental materials for this text are available at the book's Companion Website. The following are accessible to all readers who register using the prepaid access card in the front of this book:

- Links to hundreds of human-computer interaction resources, examples, and research studies that enhance and expand on the material in each chapter
- Chapter/section summaries
- Self-test questions and discussion questions for each chapter
- Homework assignments and projects

PowerPoint lecture slides are also available from Addison-Wesley's Instructor Resource Center (http://www.pearsonhighered.com/irc/). For information about accessing these instructor's supplements, visit the Instructor Resource Center or send an e-mail to *computing@aw.com*.

Acknowledgments

Writing is a lonely process; revising is a social one. We are grateful to the many colleagues and students who have made suggestions for improvements to prior editions. We particularly appreciate the strong contributions from Maxine S. Cohen to Chapters 4, 5, 9, and 12 and Steven M. Jacobs to Chapters 3, 7, 10, and 11, as well as their help throughout the book. Their experiences both in industry and in teaching with the earlier editions of the book over the course of many years added valuable perspectives to this fifth edition. After one two-day kickoff meeting, we collaborated smoothly by using e-mail, LiveSync for draft documents, and Skype for hour-long phone calls every one to three weeks. Cooperative personalities, hard work, and appropriate tools made this massive project possible even with tight time constraints. We look forward to a continuing partnership on the Companion Website and future editions.

Our close daily collaborators at the University of Maryland have a profound influence on our work: many thanks to Ben Bederson, Allison Druin, François Guimbretière, Kent Norman, Doug Oard, Jennifer Preece, Anne Rose, and Vibha Sazawal. We also appreciate the undergraduate and graduate students who provide encouraging feedback and challenging questions, plus the motivation to keep updating this book.

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Thanks also to Jonathan Feinberg, creator of the clever and free Wordle (http://www.wordle.net/), which we used to make the chapter opening graphics. These graphics are based on word frequencies in each chapter and are used per the terms of the Creative Commons Attribution 3.0 United States License.

The publisher's editorial and production staff were actively involved in this book from the start. We appreciate the contributions of Michael Hirsch, Jeffrey Holcomb, Stephanie Sellinger, Bethany Tidd, Linda Knowles, and Joyce Cosentino Wells. At Nesbitt Graphics, we thank Rose Kernan, Paul Fennessy, Risa Clow, and Jerilyn Bockorick. The copyeditor for the fourth and fifth editions, Rachel Head, taught us a lot about lucid and informative writing. We apologize if we have left out any other contributors. Finally, a further thanks goes to the students and professionals from around the world who have sent us comments and suggestions. Their provocative questions about our growing discipline and profession encourage us daily.

Ben Shneiderman (ben@cs.umd.edu)
Catherine Plaisant (plaisant@cs.umd.edu)

Brief Contents

Contents