

This book is the result of more than a decade of research by us, the authors, our students, and many of our colleagues in the field. We began writing it in 1999, hoping that it would take not much more than a few months to complete this book. Five years have passed, and almost nothing from the original draft has survived. Through working on this book, we have learned much more about information and decision theory than we thought we ever would. We are happy to report that much of what we learned has made it into this book.

This monograph is written for students, researchers, and practitioners in robotics. We believe everybody building robots has to develop software. Hence the material in this book should be relevant to every roboticist. It should also be of interest to applied statisticians, and people concerned with real-world sensor data outside the realm of robotics. To serve a wide range of readers with varying technical backgrounds, we have attempted to make this book as self-contained as possible. Some prior knowledge of linear algebra and basic probability and statistics will be helpful, but we have included a primer for the basic laws of probability, and avoided the use of advanced mathematical techniques throughout this text.

This book is also written for classroom use. Each chapter offers a number of exercises and suggests hands-on projects. When used in the classroom, each chapter should be covered in one or two lectures. Chapters should be skipped or reordered quite arbitrarily; in fact, in our own teaching we usually start right in the middle of the book, with Chapter 7. We recommend that the study of the book be accompanied by practical, hands-on experimentation as directed by the exercises at the end of each chapter. Nothing more important in robotics than doing it yourself!

Despite our very best efforts, we believe there will still be technical errors left in this book. Many of these errors have been corrected in this third printing of the book. We continue to post corrections on the book's Web site, along with other materials relevant to this book:

[www.probabilistic-robotics.org](http://www.probabilistic-robotics.org)

We hope you enjoy this book!

Sebastian Thrun  
Wolfram Burgard  
Dieter Fox