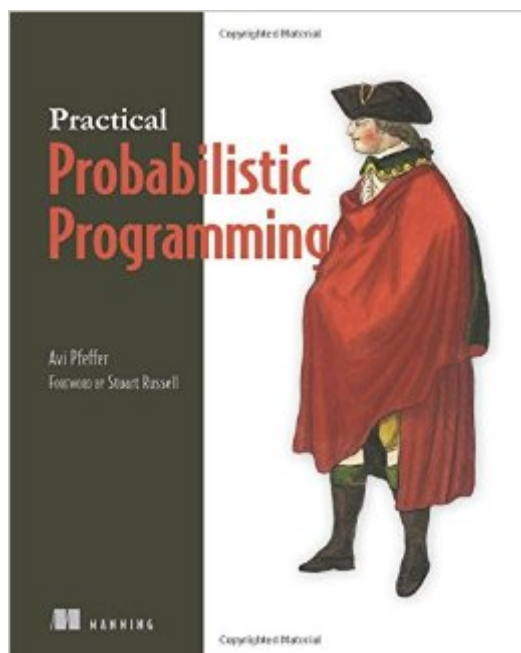


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# Practical Probabilistic Programming



## Synopsis

Summary Practical Probabilistic Programming introduces the working programmer to probabilistic programming. In it, you'll learn how to use the PP paradigm to model application domains and then express those probabilistic models in code. Although PP can seem abstract, in this book you'll immediately work on practical examples, like using the Figaro language to build a spam filter and applying Bayesian and Markov networks, to diagnose computer system data problems and recover digital images. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

About the Technology The data you accumulate about your customers, products, and website users can help you not only to interpret your past, it can also help you predict your future! Probabilistic programming uses code to draw probabilistic inferences from data. By applying specialized algorithms, your programs assign degrees of probability to conclusions. This means you can forecast future events like sales trends, computer system failures, experimental outcomes, and many other critical concerns.

About the Book Practical Probabilistic Programming introduces the working programmer to probabilistic programming. In this book, you'll immediately work on practical examples like building a spam filter, diagnosing computer system data problems, and recovering digital images. You'll discover probabilistic inference, where algorithms help make extended predictions about issues like social media usage. Along the way, you'll learn to use functional-style programming for text analysis, object-oriented models to predict social phenomena like the spread of tweets, and open universe models to gauge real-life social media usage. The book also has chapters on how probabilistic models can help in decision making and modeling of dynamic systems.

What's Inside Introduction to probabilistic modeling Writing probabilistic programs in Figaro Building Bayesian networks Predicting product lifecycles Decision-making algorithms

About the Reader This book assumes no prior exposure to probabilistic programming. Knowledge of Scala is helpful.

About the Author Avi Pfeffer is the principal developer of the Figaro language for probabilistic programming.

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PART 1 INTRODUCING PROBABILISTIC PROGRAMMING AND FIGARO Probabilistic programming in a nutshell A quick Figaro tutorial Creating a probabilistic programming application

PART 2 WRITING PROBABILISTIC PROGRAMS Probabilistic models and probabilistic programs Modeling dependencies with Bayesian and Markov networks Using Scala and Figaro collections to build up models Object-oriented probabilistic modeling Modeling dynamic systems

PART 3 INFERENCE The three rules of probabilistic inference Factored inference algorithms Sampling algorithms Solving other inference tasks Dynamic reasoning and parameter learning

## Book Information

Paperback: 456 pages

Publisher: Manning Publications; 1 edition (April 10, 2016)

Language: English

ISBN-10: 1617292338

ISBN-13: 978-1617292330

Product Dimensions: 7.3 x 1 x 9.2 inches

Shipping Weight: 1.6 pounds (View shipping rates and policies)

Average Customer Review: 3.4 out of 5 stars [See all reviews](#) (10 customer reviews)

Best Sellers Rank: #339,597 in Books (See Top 100 in Books) #56 in [Books > Computers & Technology > Computer Science > AI & Machine Learning > Machine Theory](#) #84 in [Books > Textbooks > Computer Science > Algorithms](#) #107 in [Books > Computers & Technology > Databases & Big Data > Data Warehousing](#)

## Customer Reviews

This book is divided into three parts. Part One has three chapters. Chapter One introduces probabilistic reasoning systems: what they are, why the interest in them, and what they typically consist of (e.g., a domain model, and modules for querying and carrying out evidence-based and other types of inferencing relating to the domain model). Chapter Two provides a quick introduction to Figaro, a Scala programming language-based software library that offers several modules for building probabilistic reasoning systems that integrate seamlessly with applications written in Java or Scala, an advantage that very few probabilistic programming languages currently provide; and Chapter Three provides a working but perhaps way too ahead (because of several yet to be explained concepts) example of a simple spam-filtering application that uses lightly described Figaro software constructs as building blocks. Part Two has five chapters that provide tutorials on building various types of data models (e.g., Bayesian and Markov networks), and the five chapters in Part Three delve into various types of inferencing algorithms. Source code for the examples discussed in the book and answers to select end-of-chapter exercises are available for download as separate files from the book publisher's website, the link for which as well as the instructions on how to get started with Figaro are provided in the book. This book can be a tough read for readers who don't already have a reasonably good grasp of Scala and probability concepts. While the author has made a good effort at anticipating what Scala and probability concepts readers may need help on, this book provides no introductory chapters on both, and some concepts did go unexplained or could have been explained better.

Many of us tend to view our world as controllable. Experience tells us that tomorrow will be like today. But this is all an illusion. We live in a world of probabilities. The financial markets are probabilistic, consisting of assets whose returns can be described as random variables. The outcome of many daily events are probabilistic. Programming languages like R and Python give the user access to large libraries of statistical code that aid in building models that deal with random variables. According to Avi Pfeffer's book *Practical Probabilistic Programming*, the Figaro language is a language that is designed for probabilistic data and models. A language that provides powerful abstractions for dealing with probabilistic systems is very attractive, since probabilistic models are widely useful. The promise that the Figaro language holds out is the reason that I chose to review this book for 's Vine program. *Practical Probabilistic Programming* is a promising book. The topic of the book, probabilistic codes, is a complex one. Learning a complex topic requires time and effort. Unfortunately I was not able to make the kind of progress with this book that I had hoped. I was unable to install Figaro successfully on my Fedora 20 Linux system. Figaro runs under the Scala language. The book recommends using sbt, the Scala Built Tool, with Figaro. Although the Linux yum update program informed me that I had installed the latest version of sbt, it hung when I ran the Figaro installation commands listed in the last chapter of the book. I am currently doing most of my development with either Groovy or Java, so I don't have an active Scala development environment running, although the Scala components are installed on my system.

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