



# Probabilistic Graphical Models: Principles and Techniques

*Daphne Koller , N. Friedman*

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**A general framework for constructing and using probabilistic models of complex systems that would enable a computer to use available information for making decisions.**

Most tasks require a person or an automated system to reason--to reach conclusions based on available information. The framework of probabilistic graphical models, presented in this book, provides a general approach for this task. The approach is model-based, allowing interpretable models to be constructed and then manipulated by reasoning algorithms. These models can also be learned automatically from data, allowing the approach to be used in cases where manually constructing a model is difficult or even impossible. Because uncertainty is an inescapable aspect of most real-world applications, the book focuses on probabilistic models, which make the uncertainty explicit and provide models that are more faithful to reality.

*Probabilistic Graphical Models* discusses a variety of models, spanning Bayesian networks, undirected Markov networks, discrete and continuous models, and extensions to deal with dynamical systems and relational data. For each class of models, the text describes the three fundamental cornerstones: representation, inference, and learning, presenting both basic concepts and advanced techniques. Finally, the book considers the use of the proposed framework for causal reasoning and decision making under uncertainty. The main text in each chapter provides the detailed technical development of the key ideas. Most chapters also include boxes with additional material: skill boxes, which describe techniques; case study boxes, which discuss empirical cases related to the approach described in the text, including applications in computer vision, robotics, natural language understanding, and computational biology; and concept boxes, which present significant concepts drawn from the material in the chapter. Instructors (and readers) can group chapters in various combinations, from core topics to more technically advanced material, to suit their particular needs.

## Probabilistic Graphical Models: Principles and Techniques Details

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# From Reader Review Probabilistic Graphical Models: Principles and Techniques for online ebook

## Deana says

Yes, I really am -reading- this book.

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## Gaurav Singh chauhan says

really good and comprehensive book.

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## Fuzzball Baggins says

I learned a lot, although I felt it could have been subdivided into two books - an introductory one and an advanced one - as each chapter went a bit too suddenly from 'this is what these terms mean' to using those terms to describe complicated algorithms without any (much needed) reminders of what the terms mean. Also I wish the exercises had example answers.

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## Tieta says

semua buku MIT press itu absurd kayak gini apa cuma perasaan gw doang?

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## Wooi Hen Yap says

The contents are no doubt one of the most comprehensive (too much?) available in market about PGM. For a beginner, however, it's difficult to grasp the overall concept and to even manouver around. What's drive me insane its the usage of nonstandardized mathematical symbol making reading almost crazy. Definitely not for the faint hearted as claimed in amazon.com.

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## Alexis says

I was reading the book while watching Daphne Koller's video lectures. I find that the video lectures are a lot more digestible than the book. I may be wrong but it seems to me that the book may be written for people who prefer to read mathematical proofs.

Pattern Recognition and Machine Learning (PRML) by Christopher Bishop does not go into as much detail as Probabilistic Graphical Models (PGM) on probabilistic graphical models, but I find myself cross-referencing the material that PRML does cover just to get a better understanding. Some people may prefer

the more verbose academic style that PGM offers, and it definitely covers probabilistic graphical models in more depth.

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### **Daniel Korzekwa says**

This is a great book for everyone, who wants to understand probabilistic graphical models in details, including Bayesian/Markov Networks, inference and learning from complete/incomplete data. For getting the most from this book I recommend attending Probabilistic Graphical Models Course by Professor Daphne Koller at Stanford University (<https://www.coursera.org/course/pgm>).

I wouldn't necessarily recommend it as a very first position on Bayesian Networks. Before reading it I had read the 'Modeling and Reasoning with Bayesian Networks' book by Professor Adnan Darwiche at UCLA Computer Science Department, and it was more intuitive read, perhaps, because of limiting the scope of a book to discrete variables and inference/learning in Bayesian Networks only.

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### **Randy says**

I am deeply interested in the subject of PGMs despite the fact that the area appears to be left in the dust by newer deep learning algorithms. They have a compelling 'explanatory' capability that network methods will never have. So if you work in medicine or other areas where explanatory power outweighs predictive power, PGMs are very important. It's just too bad that this is not a very good text book.

I will probably finish working on the Coursera class on PGMs but I am simply done with this textbook.

There are many much better books out there: Probabilistic Graphical Models: Principles and Applications is one that is much better by far. Another is Modeling and Reasoning with Bayesian Networks. It would be easy to say that these two books are "easier" because perhaps they are of limited scope, but that would be unfair to them regardless of scope.

Before you do anything in the area of PGMs you should take a look at Causality.

I would recommend Darwiche, and/or Sucar as source texts. Even if you sign up for Koller's popular Coursera class, you can skip the book.

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### **Scott Stensland says**

textbook by Stanford University professor, same author is currently teaching <http://www.coursera.org> a course with full online video of every classroom lecture with graded homework + tests same as Stanford students - I'm taking this course - Woo Hoo

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## **Lurino says**

two things first: not for beginners, and not for the faint of heart. if you really need a gentle introduction, this one's not for you.

that said, this book is mostly introductions to predominant probabilistic graphical models, with each chapter trying to elaborate deeply about PGMs. the mathematical symbols used are rather different, but i suppose it's not that hard to force yourself to understand what's being written.

and don't try to skim through the book. maybe it would be more useful to read this book one chapter at a time, conditional on the kind of PGM you're interested in at the moment.

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## **DJ says**

graphical models are yet another topic I should probably know something about

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## **Valia says**

I've finally made it through this book! For me, the only way to accomplish this was to participate in an online course with the same name (and then watch some of the videos again).

And I thought that Artificial Intelligence: A Modern Approach was tough!

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## **Romann Weber says**

I finally came to terms with the fact that this book was not likely to get much more than a desultory leafing through in the near-to-intermediate future. It just never really beckoned to me from my shelf. (I traded it back to Amazon.) I had high hopes, but I just couldn't see myself slogging through 1200 pages of this when I really just want some basic insight on PGM. Fortunately, there are other titles new to my shelf that I hope will scratch that itch. I may add this one back later on, after all the errata are caught and fixed in subsequent printings.

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## **Chetan says**

Read this as part of a coursera course given by Daphne Koller. Comprehensive introduction to techniques and methodology used to practically use PGMs.

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## **Farhad Da says**

This book covers a lot of topics of Probabilistic Graphical Models. It has some disadvantages like:

- Lack of examples and figures.
- It frequently refers to shapes, formulas, and tables of previous chapters which makes reading confusing.
- A lot of important proofs were skipped as exercises.
- The text is like a normal notebook of a student it could be more beautiful and organized.

With this book, I learned a lot about probabilistic graphical models but it could be easier and more fun.

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