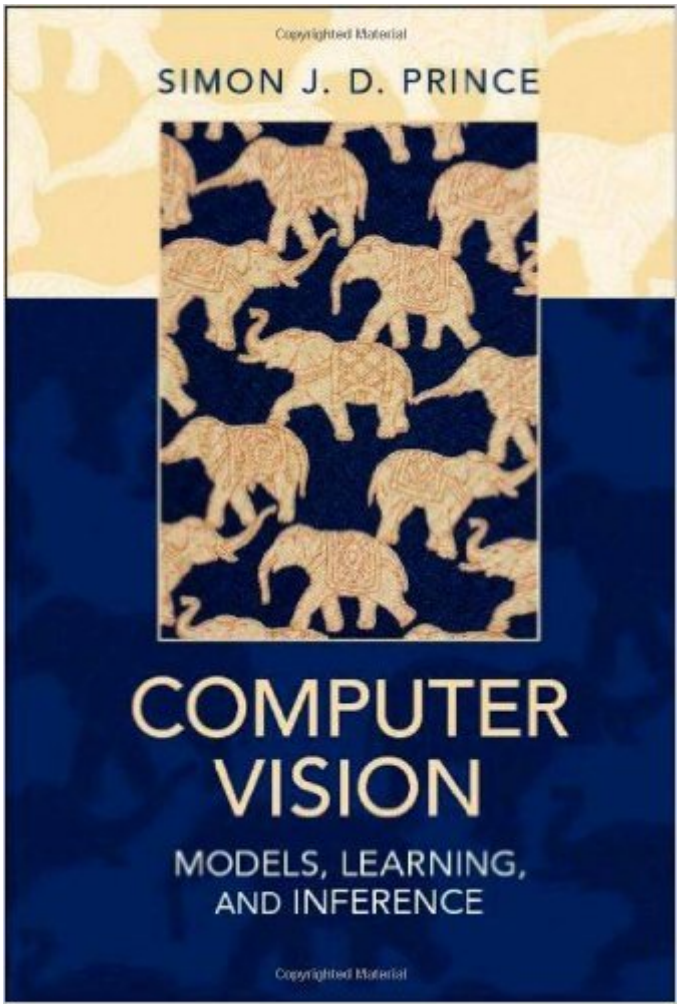
Computer Vision: Models, Learning, And Inference



Synopsis

This modern treatment of computer vision focuses on learning and inference in probabilistic models as a unifying theme. It shows how to use training data to learn the relationships between the observed image data and the aspects of the world that we wish to estimate, such as the 3D structure or the object class, and how to exploit these relationships to make new inferences about the world from new image data. With minimal prerequisites, the book starts from the basics of probability and model fitting and works up to real examples that the reader can implement and modify to build useful vision systems. Primarily meant for advanced undergraduate and graduate students, the detailed methodological presentation will also be useful for practitioners of computer vision. - Covers cutting-edge techniques, including graph cuts, machine learning, and multiple view geometry. - A unified approach shows the common basis for solutions of important computer vision problems, such as camera calibration, face recognition, and object tracking. - More than 70 algorithms are described in sufficient detail to implement. - More than 350 full-color illustrations amplify the text. - The treatment is self-contained, including all of the background mathematics. - Additional resources at www.computervisionmodels.com.

Book Information

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Customer Reviews

I teach the Machine Vision class at UCL from this textbook (for advanced undergrads + grad students). It’s the same class Simon Prince used to teach, so we cover the whole book (ok, skipping a few bits and one whole chapter) in 11 weeks of lectures. The two main reasons I like it are 1) its

unified explanation of all the major topics, and 2) the extra materials for students and teachers (free online):1) Everything is explained in terms of (essentially) the same probabilistic models. That probably doesn't sound seriously exciting, but imagine the alternative of having to learn all the complicated math for doing object recognition, camera pose estimation, tracking, pose regression, shape modeling etc, but each one using ITS OWN notation and completely different "slices" of applied machine learning! It was hard to learn, and very hard to teach. Here, almost everything is consistent (even Structure from Motion is somehow made to fit the same notation). So if you can survive Chapters 2-4 (spread gently over ~40 pages), you'll likely absorb the rest without the usual agony.2) On the book's website, Prince has built a collection of slides (pretty plain, but good), and an AMAZING (still evolving?) 75-page booklet of algorithms. While the textbook is accurate, there's normally quite some head-scratching to turn the equations into code. You obviously still have to write the code yourself, but now you have a recipe! It's clear the book would be unreadable if each algorithm's details had been included in the main text, so this seems like an ok compromise. This really could be the next "Numerical Recipes in C," but for vision :) There are interesting links to other people's data and code online too, and solutions to some of the problem sets.

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