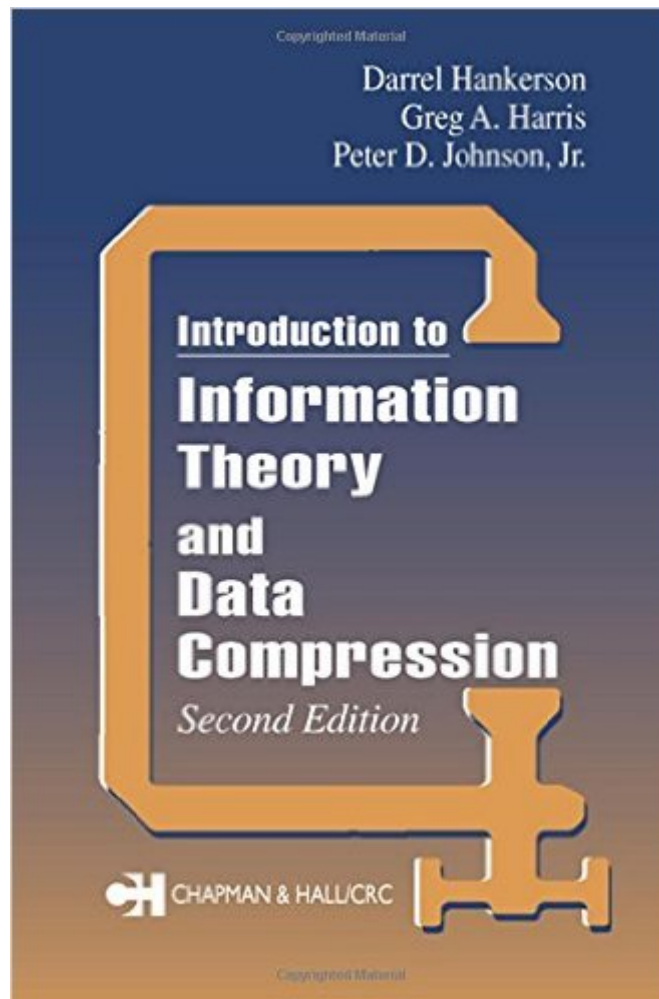# Introduction To Information Theory And Data Compression, Second Edition (Applied Mathematics)

Synopsis

An effective blend of carefully explained theory and practical applications, this text imparts the fundamentals of both information theory and data compression. Although the two topics are related, this unique text allows either topic to be presented independently, and it was specifically designed so that the data compression section requires no prior knowledge of information theory.The treatment of information theory, while theoretical and abstract, is quite elementary, making this text less daunting than many others. After presenting the fundamental definitions and results of the theory, the authors then apply the theory to memoryless, discrete channels with zeroth-order, one-state sources. The chapters on data compression acquaint students with a myriad of lossless compression methods and then introduce two lossy compression methods. Students emerge from this study competent in a wide range of techniques. The authors' presentation is highly practical but includes some important proofs, either in the text or in the exercises, so instructors can, if they choose, place more emphasis on the mathematics.Introduction to Information Theory and Data Compression, Second Edition is ideally suited for an upper-level or graduate course for students in mathematics, engineering, and computer science.Features:Expanded discussion of the historical and theoretical basis of information theory that builds a firm, intuitive grasp of the subjectReorganization of theoretical results along with new exercises, ranging from the routine to the more difficult, that reinforce students' ability to apply the definitions and results in specific situations.Simplified treatment of the algorithm(s) of Gallager and KnuthDiscussion of the information rate of a code and the trade-off between error correction and information rateTreatment of probabilistic finite state source automata, including basic results, examples, references, and exercisesOctave and MATLAB image compression codes included in an appendix for use with the exercises and projects involving transform methodsSupplementary materials, including software, available for download from the authors' Web site at www.dms.auburn.edu/compression

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Customer Reviews

The authors of this well balanced textbook succeed admirably well in teaching the subject to the union of students in math and in cs, and to engineers. The danger with subjects that cut accross fields is that they might appeal to the intersection of audiences involved rather than to the much larger union. The authors seem to be at home with all the types of readers, they realize that the lingo and the aim is different for the different and diverse groups of students. Indeed, the tools of information theory, data compression, and arithmetic coding are widely used in science. While the mathematical parts of the subject is old[Shannon, Kolmogorov..., measurements of information, entropy, channel capacity], the applications are still going strong, with new things coming out at a fast rate right up to the present. So the emphasis in the book on data and image compression is very appropriate. There is even a JPEGtool user's guide in the appendix.

I am a gradute student in computer science and I have read a lot of books on this subject, including 1- Digital Image Compression, by Weidong Kou, 2- The Data Compression Book, by Mark Nelson, 3- JPEG Still Image Data Compression Standard, by Pennebaker. I have also browsed few other books on this subject, but one thing I can say for sure, that this is the best book ever written on the subject of Compression. It explains the information theory and data Compression in the best possible way, with best examples. Once read, you will never forget the algorithms. I just love this book, and read it every once in a while.

This book breaks ground even now in the 21st Century!There's not a day that goes by - and I mean this literally -that I do not use this book to break ground - and I mean that figuratively.Wait - no, I mean that literally, too, come to think about it, if oneconsiders the as-yet-untilled fertile loam of consciousness the groundthrough which this slender tome "turns the soil..." When seedling theoryraises a tentative monocotyledon into the light of possibility, it quicklywellsprings into that cornucopia however you spell it of brilliantwhatchamacallit - information theory or simply the plain

old everydaygarden variety GENIUS that we have come to expect of Peter D. Johnson,boy inventor.More, Professor Johnson, MORE!!!

I read a lot of books on Compression, but this is indeed the best one I ever bought. I love this book and read it frequently.

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