



# Still Image and Video Compression with MATLAB

By K. S. Thyagarajan

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This book describes the principles of image and video compression techniques and introduces current and popular compression standards, such as the MPEG series. Derivations of relevant compression algorithms are developed in an easy-to-follow fashion. Numerous examples are provided in each chapter to illustrate the concepts.

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### Editorial Review

From the Back Cover

#### **The Most Comprehensive Coverage of the Theory and Practice of Image and Video Compression**

This authoritative text enables readers to grasp the basic principles of still image and video compression methods as well as the current and popular compression standards, such as JPEG, MPEG, and Advanced Video Coding (AVC). Written in clear language and with minimal mathematical derivations, it allows readers to gain practical experience in simulating actual compression systems via the globally popular MATLAB software platform.

The book first introduces qualitatively the plethora of image compression methods available followed by image acquisition techniques, illustrating the design of uniform and non-uniform quantizers. Next, various image transforms such as the discrete cosine (dct) and discrete wavelet (dwt) are explained. Predictive coding—a core ingredient in various compression standards—is reviewed, along with lossless compression methods. Then follow chapters on still image compression schemes using DCT and wavelets (where JPEG and JPEG2000 standards for still image compression are described) and video coding principles. Finally, the book explains video compression standards such as MPEG-1, 2, and 4 as well as H.264 (AVC), and covers video compression in a wireless environment.

Each chapter contains problems of varying difficulty—both analytical and software-oriented—and powerful simulation examples using MATLAB code to provide hands-on experience in applying various compression techniques. The code is simple enough to be easily modified to suit a reader's particular application. Many examples are accompanied by real-world pictures that illustrate the specific effect of a compression scheme. These unique features make this comprehensive resource an ideal textbook for senior and first-year graduate students in courses in image processing and compression in electrical engineering and computer science. It is also a concise hands-on reference for professionals and practicing engineers.

### About the Author

**K.S. Thyagarajan** is Chief Scientist at Micro USA, Inc., where he has developed an extensive suite of image processing, detection, and classification algorithms for the detection of very low contrast targets underwater in littoral waters and open oceans. He is an Emeritus Professor in the Department of Electrical and Computer Engineering at San Diego State University, and has extensive academic and industrial experience in researching and developing video compression systems. Dr. Thyagarajan's expertise lies in signal, image processing, image and video compression, pattern recognition, and communications. He holds several patents in video compression.

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