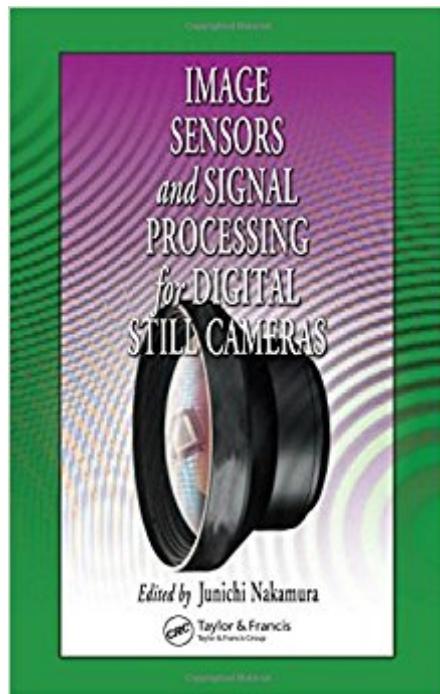


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# Image Sensors And Signal Processing For Digital Still Cameras (Optical Science And Engineering)



## Synopsis

Shrinking pixel sizes along with improvements in image sensors, optics, and electronics have elevated DSCs to levels of performance that match, and have the potential to surpass, that of silver-halide film cameras. *Image Sensors and Signal Processing for Digital Still Cameras* captures the current state of DSC image acquisition and signal processing technology and takes an all-inclusive look at the field, from the history of DSCs to future possibilities. The first chapter outlines the evolution of DSCs, their basic structure, and their major application classes. The next few chapters discuss high-quality optics that meet the requirements of better image sensors, the basic functions and performance parameters of image sensors, and detailed discussions of both CCD and CMOS image sensors. The book then discusses how color theory affects the uses of DSCs, presents basic image processing and camera control algorithms and examples of advanced image processing algorithms, explores the architecture and required performance of signal processing engines, and explains how to evaluate image quality for each component described. The book closes with a look at future technologies and the challenges that must be overcome to realize them. With contributions from many active DSC experts, *Image Sensors and Image Processing for Digital Still Cameras* offers unparalleled real-world coverage and opens wide the door for future innovation.

## Book Information

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## Customer Reviews

This book focuses on image acquisition and signal processing in digital still cameras (DSC's). From the perspective of the flow of image information, a DSC consists of imaging optics, an image sensor, and a signal processing block that receives a signal from the image sensor and generates digital data that is eventually compressed and stored on a memory device in the DSC. Chapters one and two are at a rather high level and introductory. However, in chapter 3 the book gets much more specific. Chapter 3 discusses the functions and performance parameters common to CCD and CMOS image sensors. Chapter 4 describes in detail the CCD image sensors widely used in imaging applications. The chapter ranges from a discussion of basic CCD operating principles to descriptions of CCD image sensors specifically designed for DSC applications. Chapter 5 discusses CMOS image sensor technology. Chapter 6, the final chapter focusing on sensors, describes methods for evaluating image sensor performances relative to DSC requirements. Chapter 7 shifts gears and begins the discussing of image processing algorithms. The discussion begins with color theory and its application to DSCs. Chapter 8 presents the algorithms utilized by DSC's in both hardware and software. Basic image processing and camera control algorithms are shown along with some image processing examples. Chapter 9 discusses the performance parameters for DSCs and digital video cameras followed by descriptions of the architectures of signal processing engines. Examples of the analog front-end and the digital back-end designs are introduced. Chapter 10 shows how each component previously described affects image quality. The final chapter discusses future DSC image sensors and explores a new paradigm for image sensors.

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