- **Chapter 1:** Some figures were updated and parts of the text were rewritten to correspond to changes in later chapters.
- **Chapter 2:** A new section dealing with random numbers and probability, with an emphasis on their application to image processing. Many sections and examples were rewritten for clarity.
    - 12 new examples, 31 new images, 22 new drawings, 32 new exercises, and 10 new MATLAB projects.
- **Chapter 3:** A new section on exact histogram matching, a discussion on separable filter kernels, expanded coverage on the properties of lowpass Gaussian kernels, and highpass, bandreject, and bandpass filters.
    - 6 new examples, 67 new images, 18 new line drawings, 31 new exercises, and 10 new MATLAB projects.
- **Chapter 4:** Several sections were revised to improve the clarity of presentation.
    - 35 new images, 4 new line drawings, 25 new exercises, and 10 new MATLAB projects.
- **Chapter 5:** Clarifications and a few corrections in notation.

    - 6 new images, 17 new exercises, and 10 new MATLAB projects.
- **Chapter 6:** A new chapter that brings together wavelets, several new transforms, and many of the image transforms that were scattered throughout the book. The emphasis of this chapter is on a cohesive presentation of these transforms from a unified point of view.
    - 24 new images, 20 new drawings, 25 new exercises and 15 new MATLAB projects.
- **Chapter 7:** Material dealing with color image processing was moved to this chapter. Several sections were clarified, and the explanation of the CMY and CMYK color models was expanded.
    - 2 new images and 10 new MATLAB projects.
- **Chapter 8:** Numerous clarifications and minor improvements to the presentation.
    - 10 new MATLAB projects to this chapter.

- **Chapter 9:** A complete rewrite of several sections, including redrafting of several line drawings.
    - 18 new exercises and 10 new MATLAB projects.
- **Chapter 10:** Several sections were rewritten for clarity. Updated the chapter by adding coverage of finite differences, K-means clustering, superpixels, and graph cuts.
    - 4 new examples, 31 new images, 3 new drawings, 8 new exercises, and 10 new MATLAB projects.
- **Chapter 11:** A new chapter dealing with active contours for image segmentation, including snakes and level sets. An important feature in this chapter is that it presents a derivation of the fundamental snake equation as well as a derivation of the level set equation. Both equations are derived starting from basic principles, and the methods are illustrated with numerous examples in order to bring this material to a level that could be understood by beginners in the field.
    - 17 new examples, 141 new images, 19 new drawings, 37 new problems, and 10 new MATLAB projects.

- **Chapter 12:** Chapter on feature extraction, which was moved from its 11th position in the previous edition. Updated with numerous topics, improvements in the clarity of presentation, added coverage of slope change codes, expanded explanation of skeletons, medial axes, and the distance transform, and new basic descriptors of compactness, circularity, and eccentricity. New material includes coverage of the Harris-Stephens corner detector, and a presentation of maximally stable extremal regions. A major addition to the chapter is a comprehensive discussion dealing with the Scale-Invariant Feature Transform (SIFT).
  - 65 new images, 15 new drawings, 4 new examples, 15 new exercises, and 10 new MATLAB projects.
- **Chapter 13:** Image pattern recognition chapter that was Chapter 12 in the previous edition. Now includes coverage of deep convolutional neural networks**,** an extensive rewrite of neural networks, deep learning, and a comprehensive discussion on fully-connected, deep neural networks that includes derivation of backpropagation starting from basic principles.
  - 23 new images, 28 new drawings, 12 new exercises, and 10 new MATLAB projects.

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