

<<数字图像处理>>

图书基本信息

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作者：（美）冈萨雷斯 等著

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## 前言

Solutions to problems in the field of digital image processing generally require extensive experimental work involving software simulation and testing with large sets of sample images. Although algorithm development typically is based on theoretical underpinnings, the actual implementation of these algorithms almost always requires parameter estimation and, frequently, algorithm revision and comparison of candidate solutions. Thus, selection of a flexible, comprehensive, and well-documented software development environment is a key factor that has important implications in the cost, development time, and portability of image processing solutions. In spite of its importance, surprisingly little has been written on this aspect of the field in the form of textbook material dealing with both theoretical principles and software implementation of digital image processing concepts. This book was written for just this purpose. Its main objective is to provide a foundation for implementing image processing algorithms using modern software tools. A complementary objective was to prepare a book that is self-contained and easily readable by individuals with a basic background in digital image processing, mathematical analysis, and computer programming, all at a level typical of that found in a junior/senior curriculum in a technical discipline. Rudimentary knowledge of MATLAB also is desirable. To achieve these objectives, we felt that two key ingredients were needed. The first was to select image processing material that is representative of material covered in a formal course of instruction in this field. The second was to select software tools that are well supported and documented, and which have a wide range of applications in the "real" world. To meet the first objective, most of the theoretical concepts in the following chapters were selected from *Digital Image Processing* by Gonzalez and Woods, which has been the choice introductory textbook used by educators all over the world for over two decades. The software tools selected are from the MATLAB Image Processing Toolbox (IPT), which similarly occupies a position of eminence in both education and industrial applications. A basic strategy followed in the preparation of the book was to provide a seamless integration of well-established theoretical concepts and their implementation using state-of-the-art software tools. The book is organized along the same lines as *Digital Image Processing*. In this way, the reader has easy access to a more detailed treatment of all the image processing concepts discussed here, as well as an up-to-date set of references for further reading. Following this approach made it possible to present theoretical material in a succinct manner and thus we were able to maintain a focus on the software implementation aspects of image processing problem solutions. Because it works in the MATLAB computing environment, the Image Processing Toolbox offers some significant advantages, not only in the breadth of its computational tools, but also because it is supported under most operating systems in use today.

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### 内容概要

本书是图像处理理论与以MATLAB为主要工具的软件实践方法相结合的第一本书。

特色在于重点强调如何通过开发新代码来加强软件工具。

介绍MATLAB编程基础知识之后, 讲述了图像处理的主干内容, 包括灰度变换、线性和非线性空间滤波、频率域滤波、图像恢复与配准、彩色图像处理、小波、图像数据压缩、形态学图像处理、图像分割、区域和边界表示与描述, 以及目标识别。

本书可供从事信号与信息处理、计算机科学与技术、通信工程、地球物理等专业的大专院校师生学习参考。

作者简介

作者：(美国)冈萨雷斯(Rafael C.Gonzalez) (美国)Richard E.Woods (美国)Steven L.Eddins

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## 章节摘录

插图：Another way to obtain help for a specific function is by typing `doe` followed by the function name at the command prompt. For example, typing `doe for mat` displays documentation for the function called `format` in the display pane of the Help Browser. This command opens the browser if it is not already open. M-functions have two types of information that can be displayed by the user. The first is called the H1 line, which contains the function name and a one-line description. The second is a block of explanation called the Help text block ( these are discussed in detail in Section 2.10.1 ). Typing `help` at the prompt followed by a function name displays both the H1 line and the Help text for that function in the Command Window. Occasionally, this information can be more up to date than the information in the Help browser because it is extracted directly from the documentation of the M-function in question. Typing `lookfor` followed by a keyword displays all the H1 lines that contain that keyword. This function is useful when looking for a particular topic without knowing the names of applicable functions. For example, typing `lookfor edge` at the prompt displays all the H1 lines containing that keyword. Because the H1 line contains the function name, it then becomes possible to look at specific functions using the other help methods. Typing `lookfor edge -all` at the prompt displays the H1 line of all functions that contain the word `edge` in either the H1 line or the Help text block. Words that contain the characters `edge` also are detected. For example, the H1 line of a function containing the word `polyedge` in the H1 line or Help text would also be displayed.

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