Discover the Fascinating Geometric Methods Behind Digital Picture Analysis

About the Morgan Kaufmann in Computer Series

Are you interested in the world of computer science and the latest advancements in digital image analysis? Look no further than the esteemed Morgan Kaufmann in Computer series. Renowned for their comprehensive and cutting-edge publications, this series offers invaluable resources for professionals and enthusiasts alike.

What are Geometric Methods for Digital Picture Analysis?

Digital picture analysis revolves around extracting meaningful information from images to understand and interpret the visual world. Geometric methods play a crucial role in this process, offering powerful techniques for analyzing and manipulating digital pictures.

Geometric methods in digital image analysis focus on the study of geometric structures and relationships within images. By analyzing the geometric properties of images, such as shapes, contours, and spatial arrangements, these methods enable researchers and practitioners to extract valuable insights and make informed decisions.
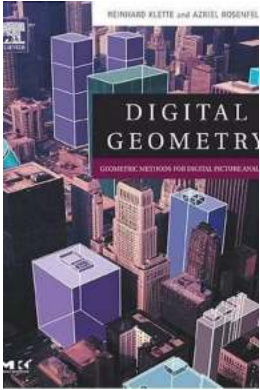
Digital Geometry: Geometric Methods for Digital Picture Analysis (The Morgan Kaufmann Series in Computer Graphics)

by Reinhard Klette (1st Edition, Kindle Edition)

★★★★★ 5 out of 5

Language	: English
File size	: 27158 KB

Text-to-Speech	: Enabled
Enhanced typesetting	: Enabled
Screen Reader	: Supported
Print length	: 675 pages

The Importance of Geometric Methods

Geometric methods in digital picture analysis have wide-ranging applications across various disciplines. They are extensively used in fields such as computer vision, pattern recognition, medical imaging, robotics, and more. Let's explore some of the key reasons why these methods are of utmost importance:

1. Object Recognition and Classification

Geometric methods facilitate object recognition and classification by identifying and characterizing the geometric features present in images. By recognizing and classifying objects based on their distinct geometric properties, these methods contribute to the development of advanced vision systems, autonomous vehicles, and augmented reality applications.

2. Image Segmentation

Image segmentation is a fundamental task in digital image analysis that involves partitioning an image into multiple regions. Geometric methods aid in segmenting images based on geometric similarities, making it easier to analyze and process individual components within an image. This is particularly crucial in medical imaging for isolating and analyzing specific structures or abnormalities.

3. Shape Analysis

Understanding and analyzing the shapes of objects within images is a key aspect of digital picture analysis. Geometric methods provide tools and algorithms for shape representation, comparison, and matching. This allows for shape-based object recognition, deformable shape modeling, and tracking, which find applications in industries such as industrial inspection, security, and biometrics.

4. Image Registration

Image registration involves aligning and combining multiple images of the same scene or object. Geometric methods play a pivotal role in accurately aligning images by estimating geometric transformations, such as translations, rotations, and scalings. This is crucial in fields like remote sensing, satellite imaging, and archaeological reconstruction.

The Morgan Kaufmann in Computer - Your Gateway to Geometric Methods

The Morgan Kaufmann in Computer series offers an extensive collection of books that delve into the world of geometric methods for digital picture analysis. These books provide in-depth knowledge, practical insights, and hands-on techniques, making them invaluable resources for researchers, students, and practitioners in the field.

Here are some notable titles from the series:

1. "Geometric Algebra for Computer Science" by Leo Dorst, Daniel Fontijne, and Stephen Mann

This book explores the powerful mathematical framework of geometric algebra and its applications in computer science. It covers a wide range of topics,

including 3D modeling, computer graphics, image processing, computer vision, and robotics.

2. "Geometric and Engineering Drawing" by K. Morling and H. Morling

This comprehensive guide focuses on the principles and techniques of engineering drawing, providing readers with a solid foundation in geometric construction, projection methods, and CAD drawing. It is an indispensable resource for students and professionals in engineering and architecture.

3. "Digital Geometry in Image Processing" by Reinhard Klette

This book delves into the field of digital geometry, presenting a thorough understanding of geometric algorithms and their applications in image processing. It covers topics such as shape analysis, segmentation, curve evolution, and 3D reconstruction.

These books, along with many others in the Morgan Kaufmann in Computer series, offer a wealth of knowledge on geometric methods for digital picture analysis.

Geometric methods are at the core of digital picture analysis, providing researchers and practitioners with powerful tools for extracting knowledge and insights from images. The Morgan Kaufmann in Computer series is your gateway to understanding and applying these methods, offering a range of authoritative publications to quench your thirst for knowledge in this exciting field.

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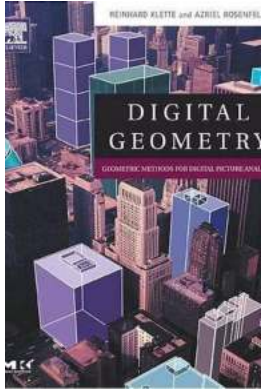
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Digital geometry is about deriving geometric information from digital pictures. The field emerged from its mathematical roots some forty-years ago through work in computer-based imaging, and it is used today in many fields, such as digital image processing and analysis (with applications in medical imaging, pattern recognition, and robotics) and of course computer graphics. Digital Geometry is the first book to detail the concepts, algorithms, and practices of the discipline. This comphrehensive text and reference provides an to the mathematical foundations of digital geometry, some of which date back to ancient times, and also discusses the key processes involved, such as geometric algorithms as well as operations on pictures.

*A comprehensive text and reference written by pioneers in digital geometry, image processing and analysis, and computer vision
*Provides a collection of state-of-the-art algorithms for a wide variety of geometrical picture analysis tasks, including extracting data from digital images and making geometric measurements on the data
*Includes exercises, examples, and references to related or more advanced work
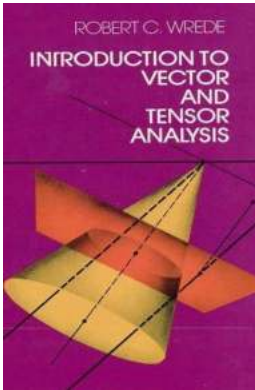
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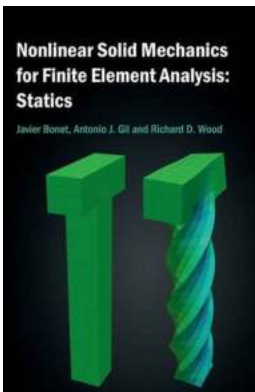
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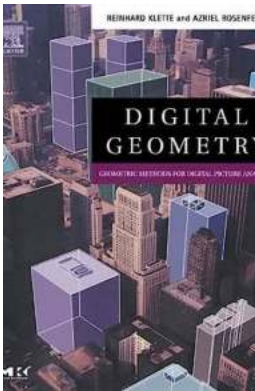
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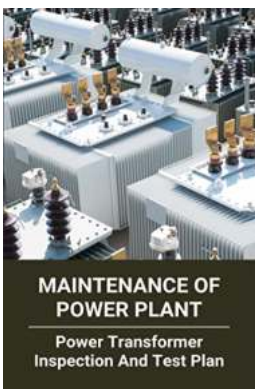
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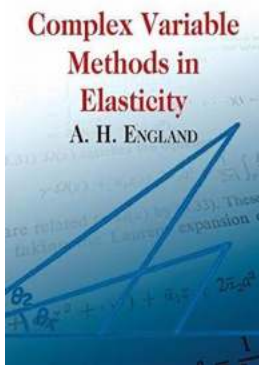
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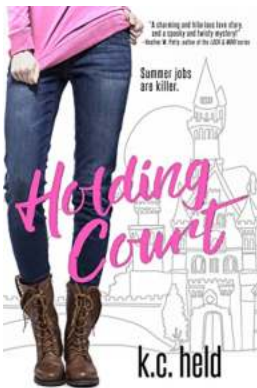
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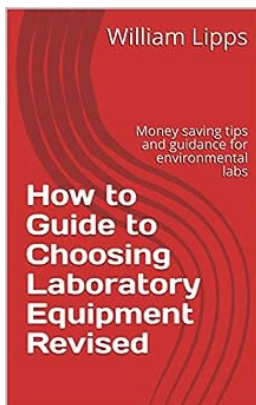
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