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Titolo	Digital geometry [[electronic resource]] : geometric methods for digital picture analysis // Reinhard Klette, Azriel Rosenfeld
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ISBN	1-281-01012-X 9786611010126 0-08-047726-7
Edizione	[1st edition]
Descrizione fisica	1 online resource (675 p.)
Collana	The Morgan Kaufmann series in computer graphics and geometric modeling
Altri autori (Persone)	RosenfeldAzriel <1931->
Disciplina	006.6
Soggetti	Image processing - Digital techniques Geometry - Data processing Image analysis Computer graphics Algorithms Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Preface; Structure of this Book; Contents; 1. Introduction; 1.1 Pictures; 1.1.1 Pixels, voxels, and their values; 1.1.2 Picture resolution and picture size; 1.1.3 Scan orders; 1.1.4 Adjacency and connectedness; 1.2 Digital Geometry and Related Disciplines; 1.2.1 Coordinates and metric spaces; 1.2.2 Euclidean, similarity, and affine geometry; 1.2.3 Projective geometry; 1.2.4 Vector and geometric algebra; 1.2.5 Graph theory; 1.2.6 Topology; 1.2.7 Approximation and estimation; 1.2.8 Combinatorial geometry; 1.2.9 Computational geometry; 1.2.10 Fuzzy geometry 1.2.11 Integral geometry, isoperimetry, stereology, and tomography1. 2.12 Mathematic morphology; 1.3 Exercises; 1.4 Commented Bibliography; 2. Grids and Digitization; 2.1 The Grid Point and Grid Cell Models; 2.1.1 Grid points and grid cells; 2.1.2 Variable grid resolution; 2.1.3 Adjacencies in 2D grids; 2.1.4 Adjacencies in 3D grids; 2.1.5 Grid cell incidence; 2.2 Connected Components; 2.2.1 Connectedness and

components; 2.2.2 Counting connected sets; 2.2.3 Component labeling; 2.3 Digitization Models; 2.3.1 Gauss digitization; 2.3.2 Jordan digitization; 2.3.3 Grid-intersection digitization  
2.3.4 Types of digital sets 2.3.5 Domain digitizations; 2.4 Property Estimation; 2.4.1 Content estimation; 2.4.2 Convergent 2D area estimates; 2.4.3 Multigrid convergence; 2.5 Exercises; 2.6 Commented Bibliography; 3. Metrics; 3.1 Basics About Metrics; 3.1.1 The Euclidean metric; 3.1.2 Norms and Minkowski metrics; 3.1.3 Scalar products and angles; 3.1.4 Integer-Valued metrics; 3.1.5 Restricting and combining metrics; 3.1.6 Boundedness; 3.1.7 The topology induced by a metric; 3.1.8 Distances between sets; 3.2 Grid Point Metrics; 3.2.1 Basic grid point metrics  
3.2.2 Neighborhoods and degrees of closeness 3.2.3 Approximations to the Euclidean metric; 3.2.4 Paths, geodesics, and intrinsic distances; 3.2.5 Distances between sets; 3.3 Grid Cell Metrics; 3.3.1 Basic grid cell metrics; 3.3.2 Seminorms; 3.3.3 Scalar products and angles; 3.4 Metrics on Pictures; 3.4.1 Value-weighted distance; 3.4.2 Distance transforms; 3.4.3 The Euclidean distance transform; 3.4.4 Medial axes; 3.5 Exercises; 3.6 Commented Bibliography; 4. Adjacency Graphs; 4.1 Graphs, Adjacency Structures, and Adjacency Graphs; 4.1.1 Graphs and adjacency structures  
4.1.2 Connectedness with respect to a subgraph 4.1.3 Adjacency graphs; 4.1.4 Types of nodes; region adjacencies; 4.2 Some Basics of Graph Theory; 4.2.1 Nodes, paths, and distances; 4.2.2 Special types of nodes, edges, and graphs; 4.3 Oriented Adjacency Graphs; 4.3.1 Local circular orders; 4.3.2 The Euler characteristic and planarity; 4.3.3 Atomic and border cycles; 4.3.4 The separation theorem; 4.3.5 Holes; 4.3.6 Boundaries; 4.3.7 Some combinatorial results; 4.4 Combinatorial Maps; 4.4.1 2D maps; 4.4.2 3D maps; 4.5 Exercises; 4.6 Commented Bibliography; 5. Incidence Pseudographs  
5.1 Incidence Structures

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## Sommario/riassunto

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 comprehensive text and reference provides an introduction to the mathematical foundations of digital geometry.

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