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Autore	Okalik Paul
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2. Record Nr.	UNINA9910464514903321
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Altri autori (Persone)	DuaSumeet Acharya URajendra NgE. Y. K
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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Contents; Chapter 1. The Biological and Computational Bases of Vision Hilary W. Thompson; 1.1. Introduction to the Eye; 1.2. The Anatomy of the Human Visual System; 1.3. Neurons; 1.4. Synapses; 1.5. Vision - Sensory Transduction; 1.6. Retinal Processing; 1.7. Visual Processing in the Brain; 1.8. Biological Vision and Computer Vision Algorithms; References; Chapter 2. Computational Methods for Feature Detection in Optical Images Michael Dessauer and Sumeet Dua; 2.1. Introduction to Computational Methods for Feature Detection; 2.2. Preprocessing Methods for Retinal Images 2.2.1. Illumination Effect Reduction 2.2.1.1. Non-linear brightness transform; 2.2.1.2. Background identification methods; 2.2.2. Image Normalization and Enhancement; 2.2.2.1. Color channel transformations; 2.2.2.2. Image smoothing through spatial filtering; 2.2.2.3. Local adaptive contrast enhancement; 2.2.2.4. Histogram transformations; 2.3. Segmentation Methods for Retinal Anatomy Detection and Localization; 2.3.1. A Boundary Detection Methods; 2.3.1.1. First-order difference operators; 2.3.1.2. Second-order boundary detection; 2.3.1.3. Canny edge detection

2.3.2. Edge Linkage Methods for Boundary Detection  
2.3.2.1. Local neighborhood gradient thresholding; 2.3.2.2. Morphological operations for edge link enhancement; 2.3.2.3. Hough transform for edge linking;  
2.3.3. Thresholding for Image Segmentation; 2.3.3.1. Segmentation with a single threshold; 2.3.3.2. Multi-level thresholding; 2.3.3.3. Windowed thresholding; 2.3.4. Region-Based Methods for Image Segmentation; 2.3.4.1. Region growing; 2.3.4.2. Watershed segmentation; 2.3.4.3. Matched filter segmentation; 2.4. Feature Representation Methods for Classification; 2.4.1. Statistical Features  
2.4.1.1. Geometric descriptors  
2.4.1.2. Texture features; 2.4.1.3. Invariant moments; 2.4.2. Data Transformations; 2.4.2.1. Fourier descriptors; 2.4.2.2. Principal component analysis (PCA); 2.4.3. Multiscale Features; 2.4.3.1. Wavelet transform; 2.4.3.2. Scale-space methods for feature extraction; 2.5. Summary; References; Chapter 3. Computational Decision Support Systems and Diagnostic Tools in Ophthalmology: A Schematic Survey Sumeet Dua and Mohit Jain; 3.1. Evidence- and Value-Based Medicine; 3.1.1. EBM Process; 3.1.2. Evidence-Based Medical Issues; 3.1.3. Value-Based Evidence  
3.2. Economic Evaluation of the Prevention and Treatment of Vision-Related Diseases  
3.2.1. Economic Evaluation; 3.2.2. Decision Analysis Method; 3.2.3. Advantages of Decision Analysis; 3.2.4. Perspective in Decision Analysis; 3.2.5. Decision Tree in Decision Analysis; 3.3. Use of Information Technologies for Diagnosis in Ophthalmology; 3.3.1. Data Mining in Ophthalmology; 3.3.2. Graphical User Interface; 3.4. Role of Computational System in Curing Disease of an Eye; 3.4.1. Computational Decision Support System: Diabetic Retinopathy; 3.4.1.1. Wavelet-based neural network  
3.4.1.2. Content-based image retrieval

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## Sommario/riassunto

Advances in semi-automated high-throughput image data collection routines, coupled with a decline in storage costs and an increase in high-performance computing solutions have led to an exponential surge in data collected by biomedical scientists and medical practitioners. Interpreting this raw data is a challenging task, and nowhere is this more evident than in the field of ophthalmology. The sheer speed at which data on cataracts, diabetic retinopathy, glaucoma and other eye disorders are collected, makes it impossible for the human observer to directly monitor subtle, yet critical details. T

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