

CONTENTS

<i>List of Contributors</i>	<i>page xi</i>
1 Medical Image Perception EHSAN SAMEI AND ELIZABETH A. KRUPINSKI	1
Part I Historical Reflections and Theoretical Foundations	
2 A Short History of Image Perception in Medical Radiology HAROLD KUNDEL AND CALVIN F. NODINE	11
3 Spatial Vision Research without Noise ARTHUR BURGESS	23
4 Signal Detection Theory: A Brief History ARTHUR BURGESS	28
5 Signal Detection in Radiology ARTHUR BURGESS	49
6 Lessons from Dinners with the Giants of Modern Image Science ROBERT WAGNER	76
7 Perception in Context DAVID MANNING	82
Part II Science of Image Perception	
8 Perceptual Factors in Reading Medical Images ELIZABETH A. KRUPINSKI	95
9 Cognitive Factors in Reading Medical Images: Thinking Processes in Image Interpretation DAVID MANNING	107
10 Satisfaction of Search in Radiology KEVIN BERBAUM, EDMUND FRANKEN, ROBERT CALDWELL, KEVIN SCHARTZ, AND MARK MADSEN	121
11 Acquiring Expertise in Radiologic Image Interpretation CALVIN F. NODINE AND CLAUDIA MELLO-THOMS	167
12 The First Moments of Medical Image Perception JEREMY M. WOLFE, KARLA K. EVANS, AND TRAFTON DREW	188
13 Image Quality and Its Clinical Relevance JUSTIN SOLOMON, ROBERT SAUNDERS, JR., AND EHSAN SAMEI	197

Part III Perception Metrology

14	Designing Perception Experiments	215
	EH SAN SAMEI	
15	Receiver Operating Characteristic Analysis: Basic Concepts and Practical Applications	227
	GEORGIA TOURASSI	
16	Multireader ROC Analysis	245
	STEPHEN L. HILLIS	
17	Memory Effects and Experimental Design	263
	TAMARA MINER HAYGOOD AND KARLA K. EVANS	
18	Observer Models as a Surrogate to Perception Experiments	276
	CRAIG K. ABBEY AND MIGUEL P. ECKSTEIN	
19	Implementation of Observer Models	289
	MATTHEW A. KUPINSKI	
20	Value and Limitations of Observer Models	300
	LUCRETIU M. POPESCU	

Part IV Clinical Performance Assessment

21	Perception of Volumetric Data	307
	GEOFFREY D. RUBIN, TRAF TON DREW, AND LAUREN H. WILLIAMS	
22	Performance Assessment Using Standardized Data Sets: The PERFORMS Scheme in Breast Screening and Other Domains	328
	YAN CHEN AND ALASTAIR GALE	
23	Breast Screen Reader Assessment Strategy (BREAST): A Research Infrastructure with a Translational Objective	343
	PATRICK BRENNAN, LEE WARWICK, AND KRISCIA TAPIA	

Part V Computational Perception

24	CAD: An Image Perception Perspective	359
	MARYELLEN GIGER AND WEIJIE CHEN	
25	Common Designs of CAD Studies	374
	YULEI JIANG	
26	Evaluation of CAD and Radiomic Tools	389
	BERKMAN SAHINER AND NICHOLAS PETRICK	
27	Quantitative Imaging: Images to Numbers	407
	DANIEL C. SULLIVAN AND EDWARD F. JACKSON	

Part VI Applied Perception

28	Optimization of 2D and 3D Radiographic Imaging Systems	417
	JEFFREY H. SIEWERDSEN	
29	Display Optimization from a Physics Perspective	440
	ALISA WALZ-FLANNIGAN AND SCOTT F. STEKEL	

	<i>Contents</i>	<i>ix</i>
30 Display Optimization from a Perception Perspective MARK F. MCENTEE AND RACHEL J. TOOMEY	452	
31 Perception and Training WILLIAM F. AUFFERMANN AND MACIEJ MAZUROWSKI	470	
32 Ergonomics 2.0: Fatigue in Medical Imaging SIAN TAYLOR-PHILLIPS, CHRIS STINTON, AND ELIZABETH A. KRUPINSKI	483	
33 Perception Issues in Pathology LIRON PANTANOWITZ, CLAUDIA MELLO-THOMS, AND ELIZABETH A. KRUPINSKI	495	
34 Medical Image Perception from a Clinical Perspective FRANCINE L. JACOBSON	506	
35 Future of Medical Image Perception ELIZABETH A. KRUPINSKI AND EHSAN SAMEI	513	
<i>Index</i>	517	