

Contents

Preface	xii
1 Introduction	1
I Simulating Artistic Media	5
2 Simulating Artistic Media: Drawing	7
2.1 Background	7
2.2 Simulating Pencil	8
2.3 Simulating Pen-and-Ink	18
2.4 Summary	27
3 Simulating Artistic Media: Painting	29
3.1 Background	30
3.2 Simulating Brushes	31
3.3 Simulating Substrate	39
3.4 Simulating Media	45
3.5 Summary	49
II Assisting a User in the Artistic Process	51
4 Assisting a User: Drawing and Painting Systems	53
4.1 Background	53
4.2 Artistic Rendering of Portrait Photographs	56

4.3	Paint By Numbers: Abstract Image Representations	63
4.4	Painterly Rendering for Animation	64
4.5	Digital Facial Engraving	67
4.6	Summary	71
5	Assisting a User: Modeling and Graftals	73
5.1	Sketching to Create Models	74
5.2	Graftals	85
6	Assisting a User: Animation and Three-Dimensional Environments	93
6.1	A Study of an Example NPR Animation	94
6.2	Two-Dimensional Systems	95
6.3	Three-Dimensional Systems	100
III	Automatic Systems	115
7	Feature Edges: Silhouettes, Boundaries, and Creases	117
7.1	Image Space Algorithms	120
7.2	Object Space Algorithms	129
7.3	Summary	145
8	Automatic Systems: Illustration	147
8.1	Artistic Line Drawing	147
8.2	Artistic Shading	160
9	Automatic Systems: Painting	189
9.1	Background	189
9.2	Processing Images and Video for An Impressionist Effect .	191
9.3	Painterly Rendering with Curved Brushstrokes of Multiple Sizes	195
9.4	Statistical Techniques for the Automated Synthesis of Non-Photorealistic Images	207
9.5	Automatic Painterly Rendering Based on Local Source-Image Approximation	209
9.6	Artistically Motivated Halftoning	212
9.7	Summary	215
	Bibliography	219
	Index	241