Introduction to Computer Vision Active Contours

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1 Introduction

This lab deals with implementing Active Contours to segment objects in an Image. This implementation uses two distance based internal energy terms and a sobel based gradient term for external energy.

2 Implementation

The implementation of the Active Contours has 3 broad stages - creating a sobel image for external energy, implementing a distance metric for Internal energy term 1, and another distance metric that includes average contour separation as internal energy term 2.

2.1 Sobel Filter

The Sobel filter is implemented in two phases (x-direction and y-direction) and these values are squared and added to generate a Gradient matrix. This is then normalized for output, and subsequently used as the external energy metric.

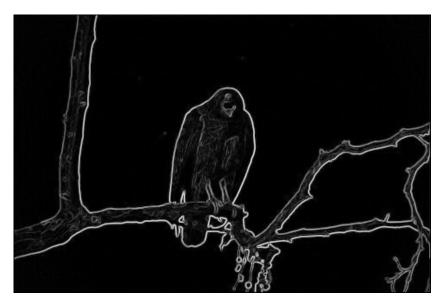


Figure 1: Sobel Filter Output

2.2 Active Contours

The initial placement of the contour points are shown in 2. The final position of the contour points after 30 iterations is shown in 3.



Figure 2: Initial Contour Points



Figure 3: Final Contour Points

3 Results

The x and y positions of the final contours is given in table

Table 1: Final Contour Locations

X Y 246 84
24h 84
261 92
263 96
265 103
278 112
286 125
286 125
277 144
277 157
273 170
273 170
266 188
258 207
265 226
253 227
240 234
240 234
222 252
221 257
212 266
212 266
194 260
184 261
187 253
181 243
166 237
169 220
169 220
180 201
181 195
174 182
174 162 177 172
184 165
184 105 188 145
182 130
196 122
202 112
208 97
225 90
225 90
246 84
231 65