

Task 1 – binary morphology versus region growing

Questions in 'Final_Task1_tcg' file

First domain - Dog sprinting

First we read the two images. We shrink their size by half, so as to quicken the segmentation process.

```
img_path = "images/final/task_1/";  
  
image1 = imread(img_path + "dog_1.jpg");  
img1small = imresize(image1, 0.5);  
  
image2 = imread(img_path + "dog_2.jpeg");  
img2small = imresize(image2, 0.5);  
  
img1gray = rgb2gray(img1small);  
img2gray = rgb2gray(img2small);  
  
img1bw = imbinarize(img1gray);  
img2bw = imbinarize(img2gray);  
  
imshow(img1gray);  
title('Original image 1')
```

Original image 1



```
imshow(img2gray);  
title('Original image 2')
```



We would like to extract the dogs from the images.

Region growing

First image

```
mask1 = zeros(size(img1gray));  
mask1(25:end-25,25:end-25) = 1;  
imshow(mask1)  
title('Initial Contour Location for image 1')
```

Initial Contour Location for image 1



```
bw1snake = activecontour(img1gray, mask1, 2000);
```

```
bw1snakeFinal = bwareaopen(bw1snake, 300);  
imshow(bw1snakeFinal)  
title('Final cleaned up image 1')
```

Final cleaned up image 1



Second image

```
mask2 = zeros(size(img2gray));  
mask2(25:end-25,25:end-25) = 1;  
imshow(mask2)  
title('Initial Contour Location for image 2')
```

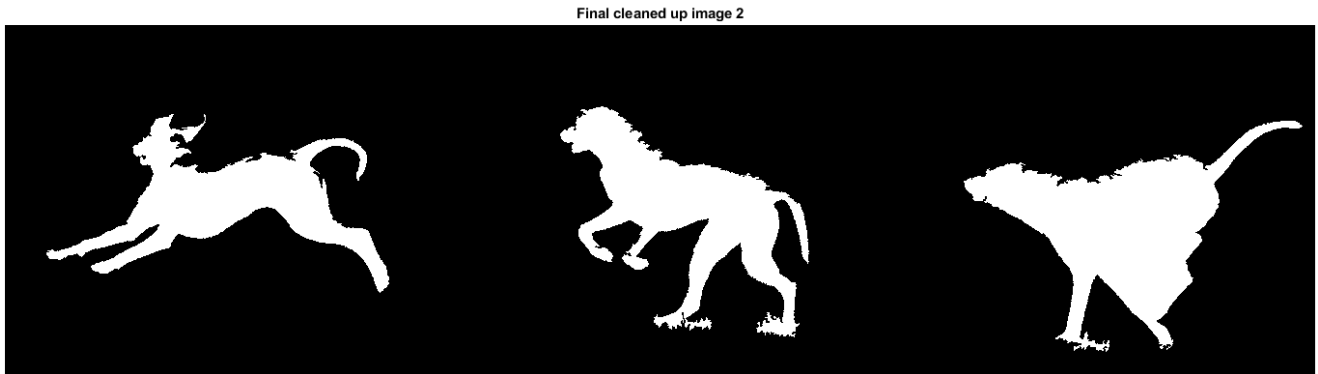
Initial Contour Location for image 2



```
bw2snake = activecontour(img2gray, mask2, 2000);
```

```
bw2snakeFinal = bwareaopen(bw2snake, 600);  
imshow(bw2snakeFinal)
```

```
title('Final cleaned up image 2')
```



Morphological operators

For this step, a square structuring element that is 10 pixels wide will be used.

First image

```
se = strel('square',10);  
bw1morphDil = imdilate(img1bw, se);  
imshow(bw1morphDil);
```



```
img1edges = imsubtract(bw1morphDil, img1bw);  
imshow(img1edges);
```

```
title('Edges from image 1')
```

Edges from image 1



```
bw1morphEro = imerode(img1bw, se);  
imshow(bw1morphEro);
```



```
img1contour = imsubtract(img1bw, bw1morphEro);  
imshow(img1contour);  
title('Contour from image 1')
```

Contour from image 1



Here we have the cleaned up versions.

```
img1edgesFinal = bwareaopen(img1edges, 300);  
imshow(img1edgesFinal); title('Final version image 1 - edges')
```


Final version image 1 - edges



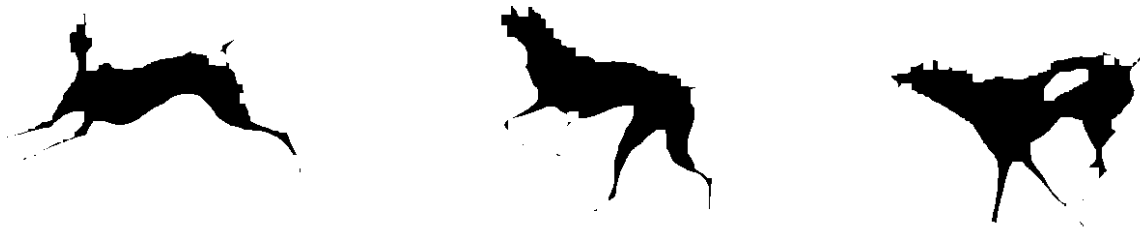
```
img1contourFinal = bwareaopen(img1contour, 500);  
imshow(img1contourFinal); title('Final version image 1 - contour');
```

Final version image 1 - contour

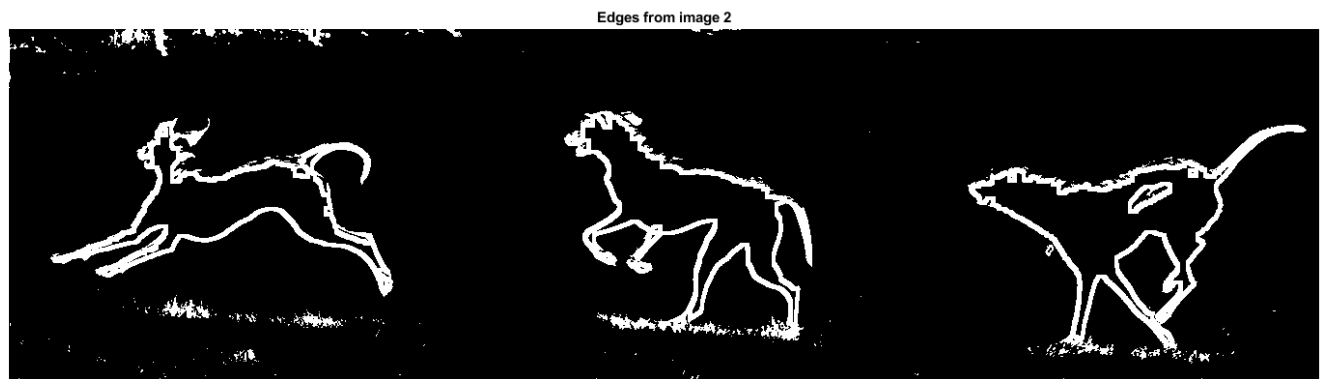


Second image

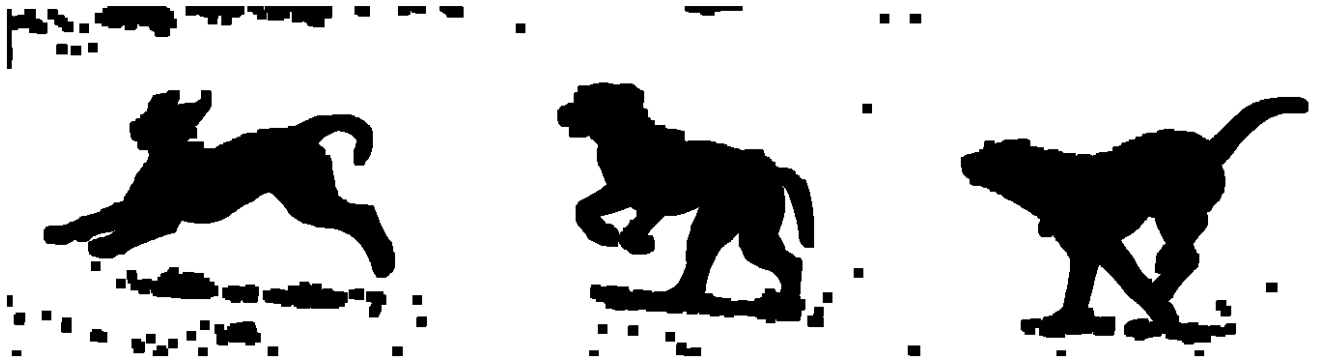
```
se = strel('square',10);  
bw2morphDil = imdilate(img2bw, se);  
imshow(bw2morphDil);
```



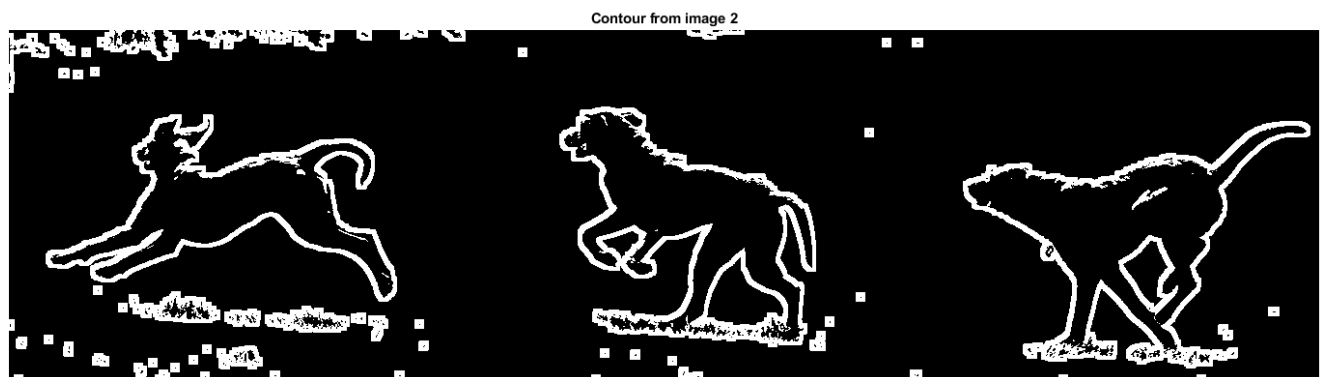
```
img2edges = imsubtract(bw2morphDil, img2bw);  
imshow(img2edges);  
title('Edges from image 2')
```



```
bw2morphEro = imerode(img2bw, se);
imshow(bw2morphEro);
```



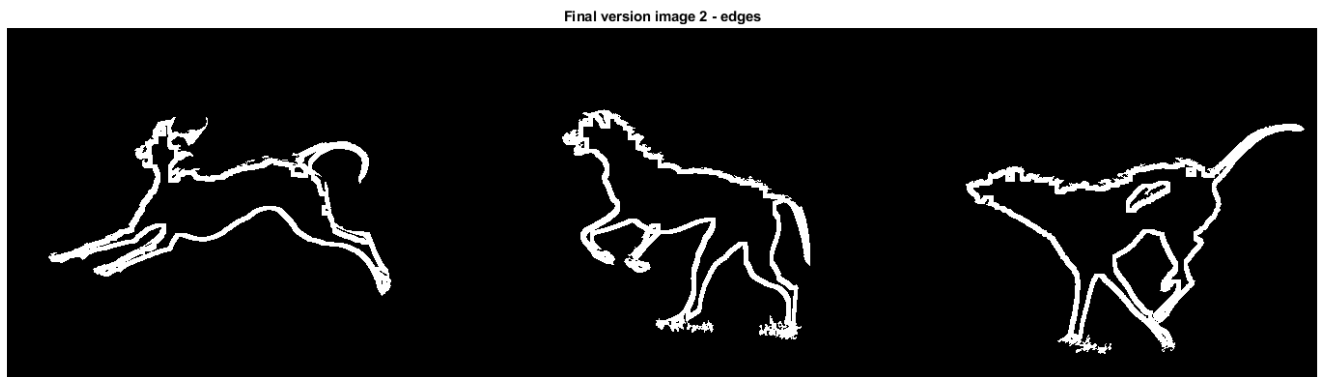
```
img2contour = imsubtract(img2bw, bw2morphEro);
imshow(img2contour);
title('Contour from image 2')
```



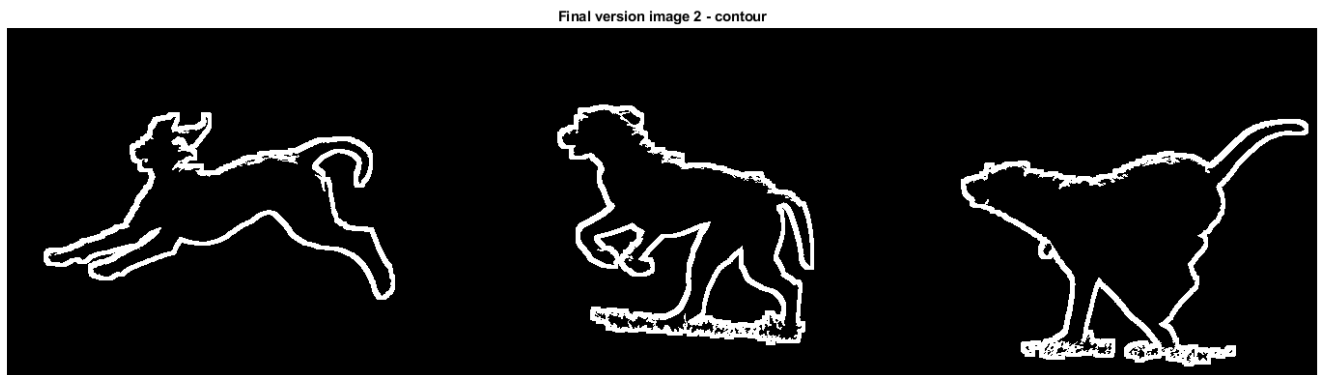
Here we have the cleaned up versions.

```
img2edgesFinal = bwareaopen(img2edges, 600);
```

```
imshow(img2edgesFinal); title('Final version image 2 - edges')
```



```
img2contourFinal = bwareaopen(img2contour, 1650);  
imshow(img2contourFinal); title('Final version image 2 - contour');
```

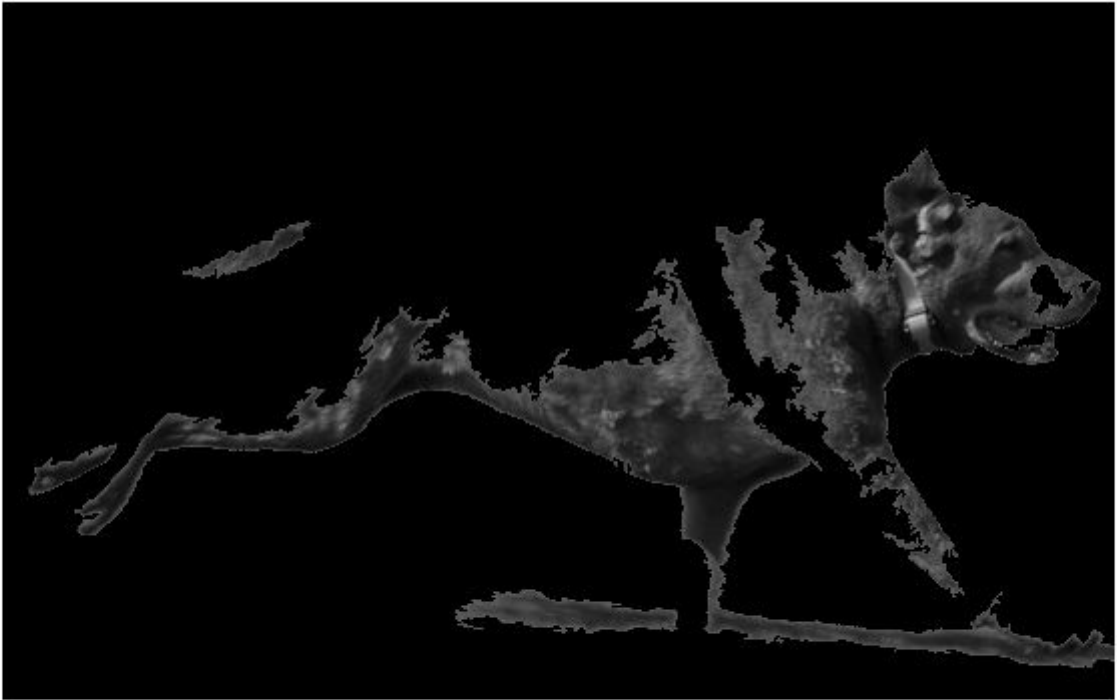


Conclusion

In terms of performance, the morphological operators execute way faster compared to region growing. We needed to shrink the size of the pictures so that the region growing algorithm finished faster.

Both morphological operators and region growing offers satisfactory results. Region growing ends with the silhouette of the dogs, while the morphological operators achieve the contour of the dogs.

```
img1gray(~bw1snakeFinal) = 0;  
imshow(img1gray);
```



```
img2gray(~bw2snakeFinal) = 0;  
imshow(img2gray);
```

