CAP5415 - COMPUTER VISION

Programming assignment 4

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Simple thresholding based image binarization algorithm

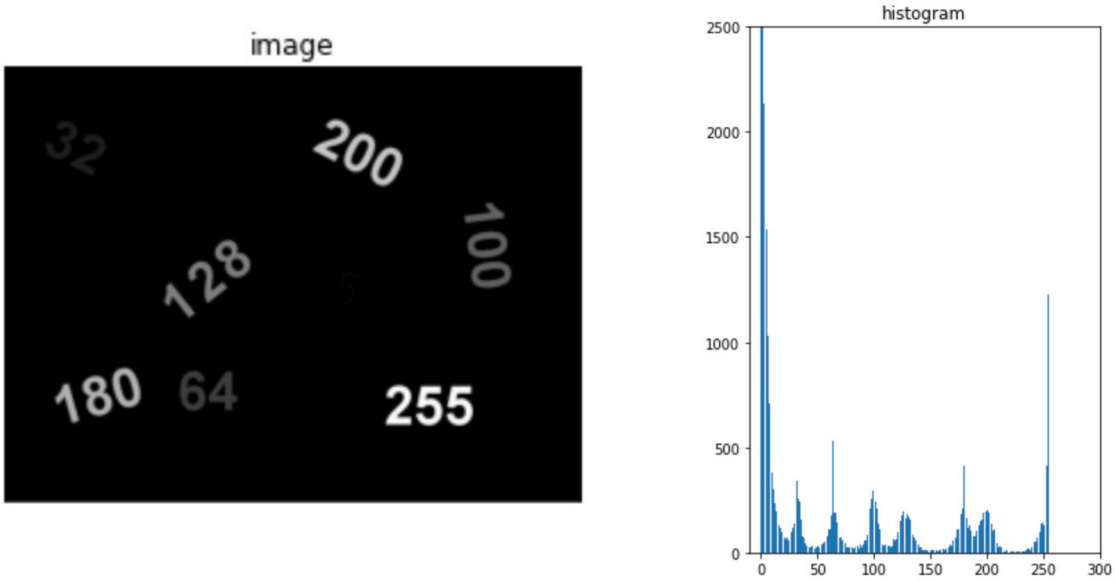
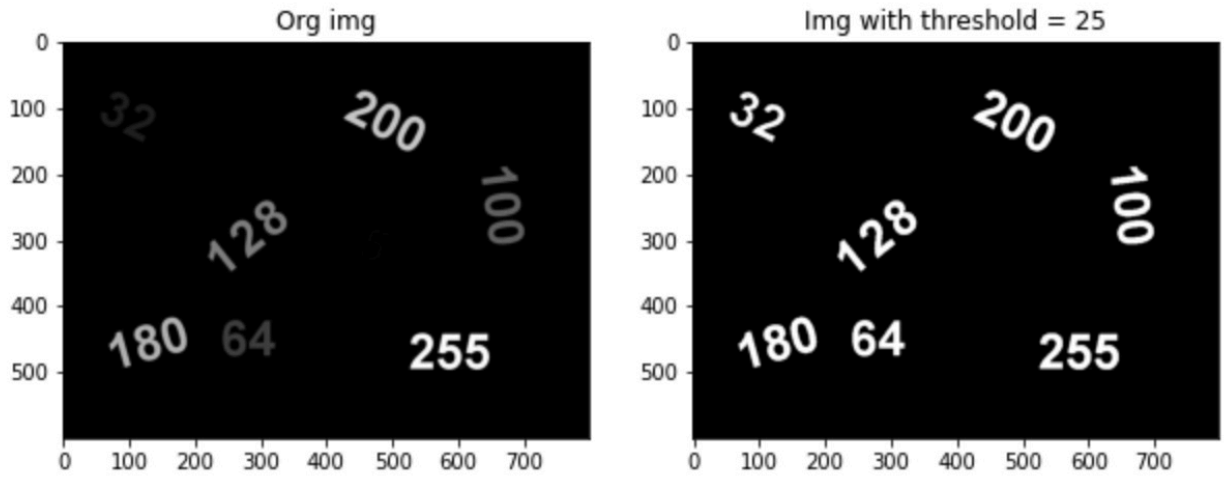
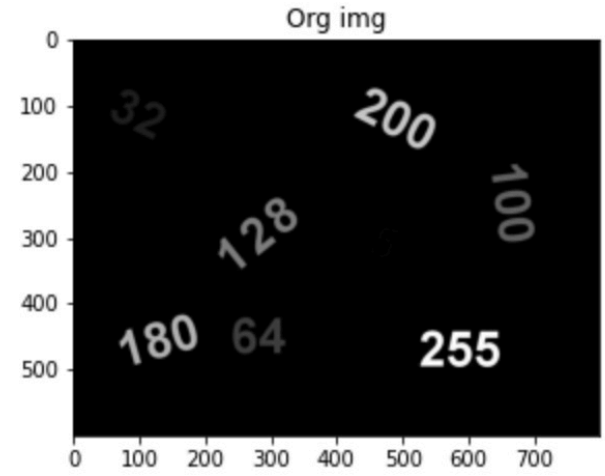
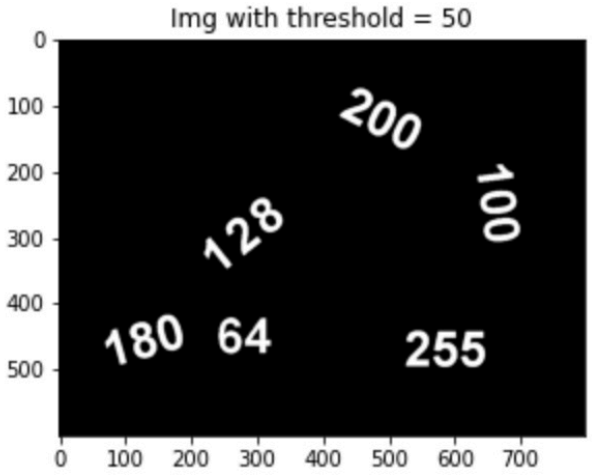


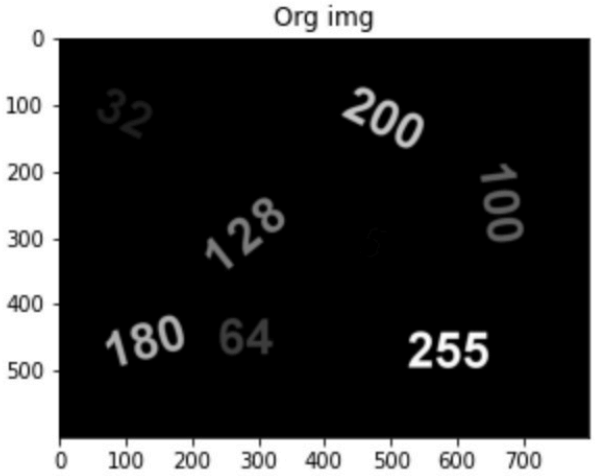
Image 1

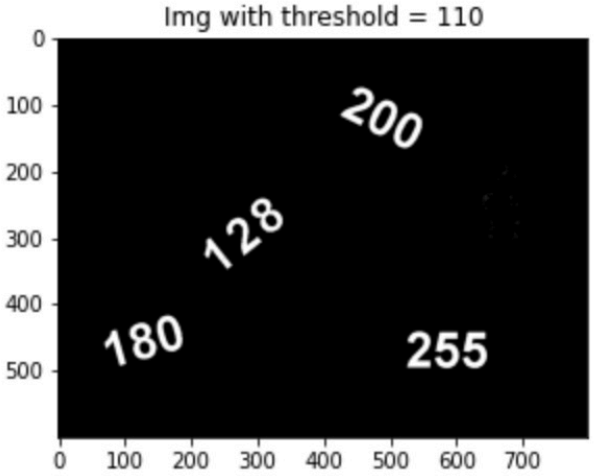
- We can see that we can choose multiple threshold values and get different results
potential threshold values are: 25, 50, 75, 110, 155, 225
- After the binarization using the threshold, we can see that the pixels with lower intensities are completely removed (turned off).
- Example, when a threshold of 110 is applied to the image, all the pixel values less than 110 i.e. 32, 64 and 100 are set to 0 while all the pixel value values greater than 110 i.e. 128, 180, 200 and 255 are set to max.

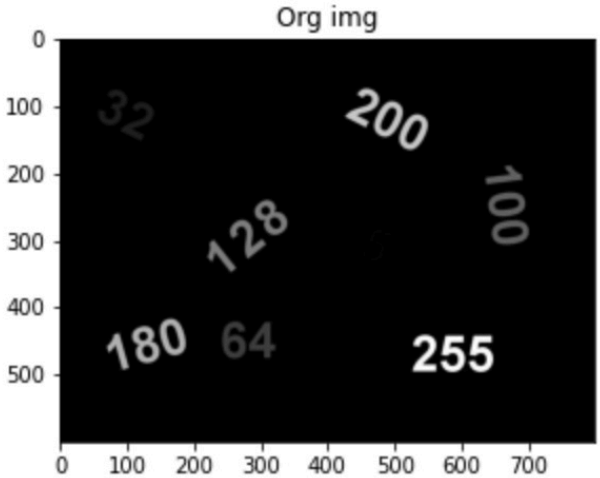


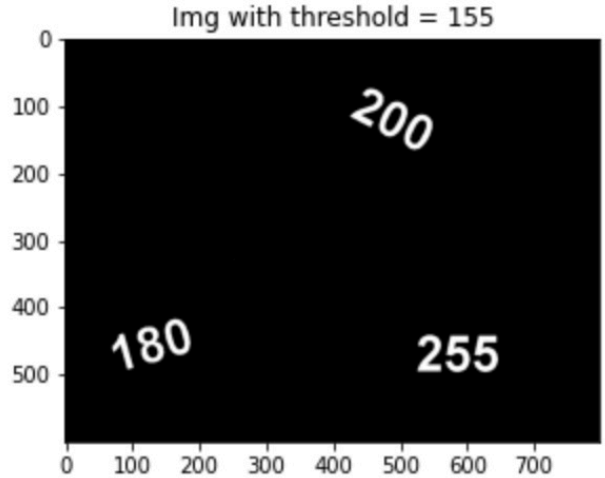

Org img
32
200
100
128
180
64
255

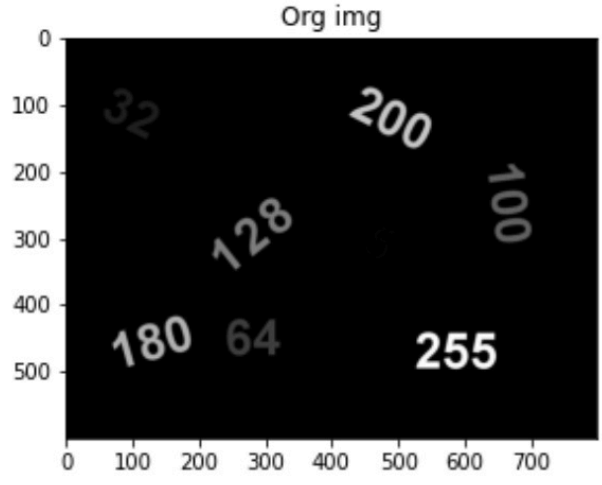

Img with threshold = 50
200
100
128
180
64
255


Org img
32
200
100
128
180
64
255


Img with threshold = 110
200
128
180
255


Org img
32
200
100
128
180
64
255


Img with threshold = 155
200
180
255


Org img
32
200
100
128
180
64
255

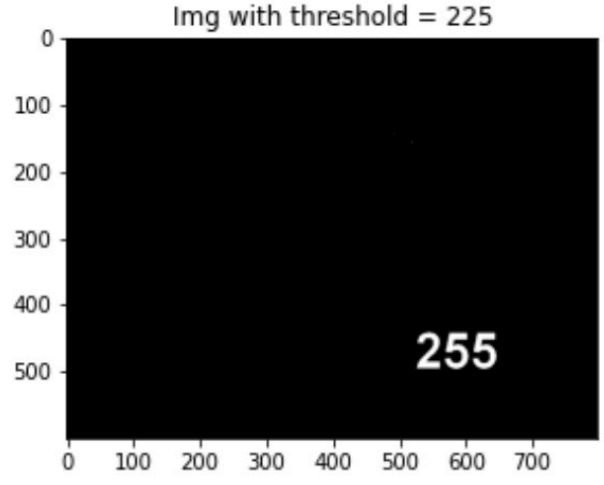
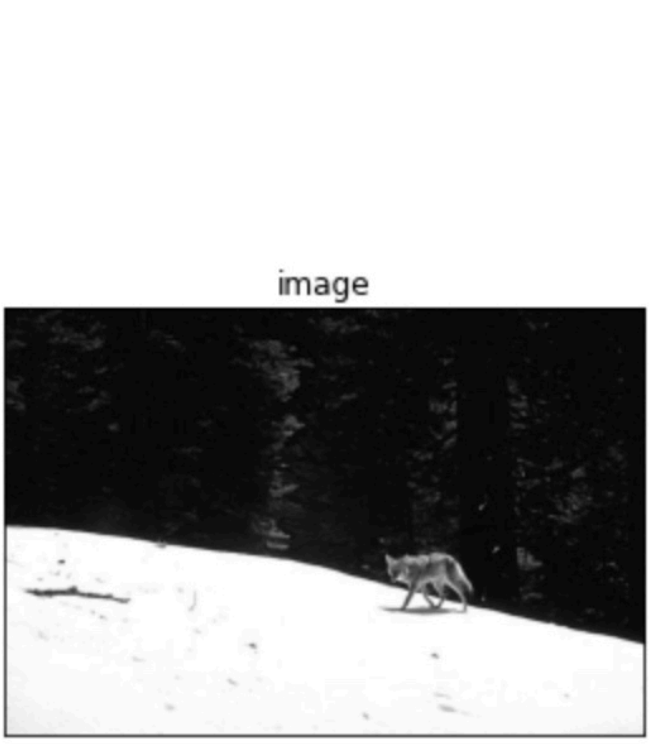
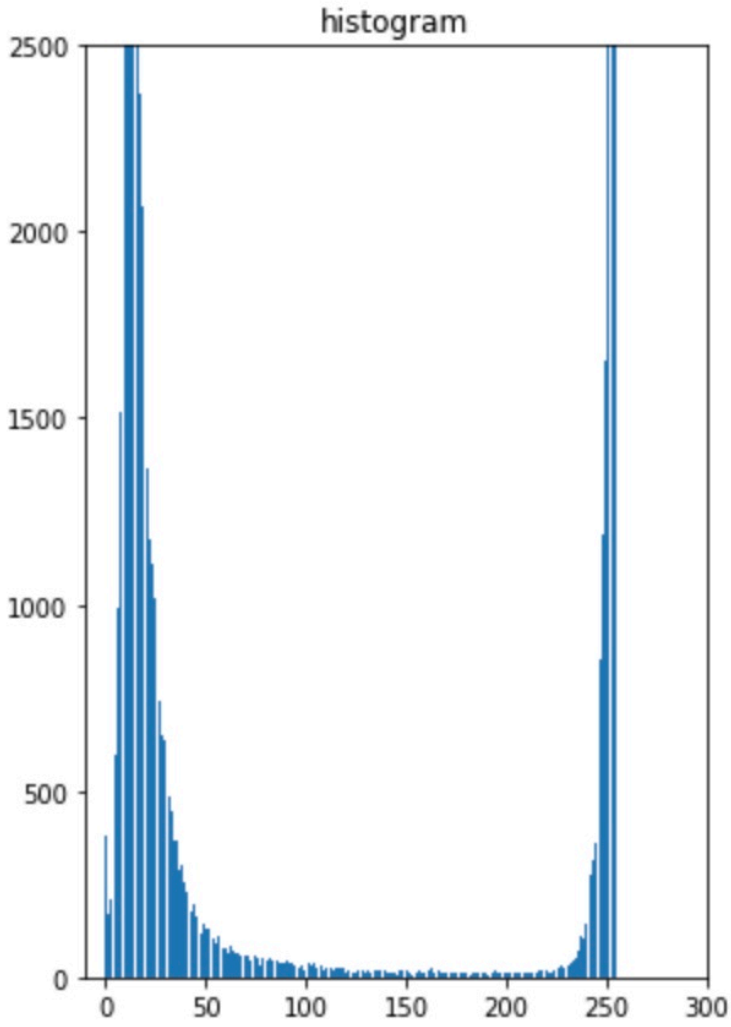
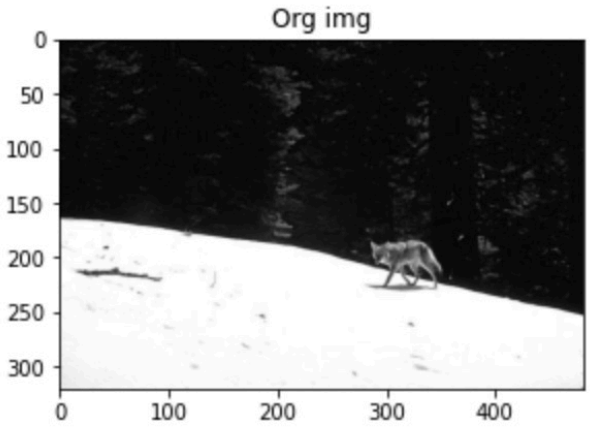

Img with threshold = 225
255

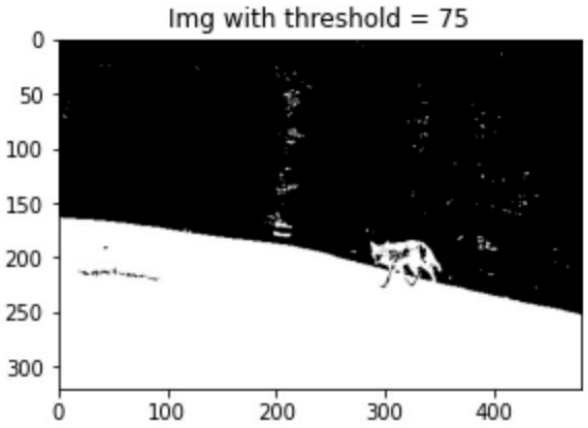
Image 2

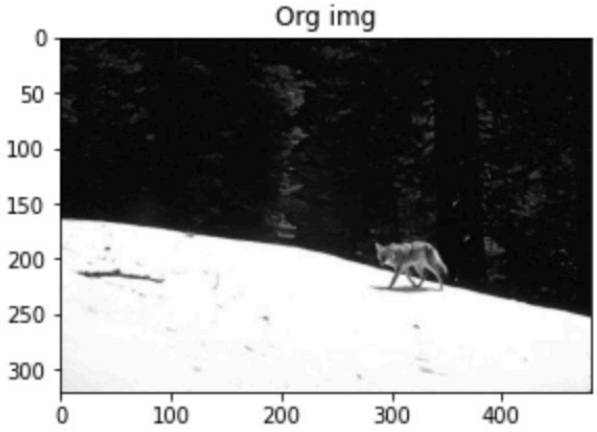


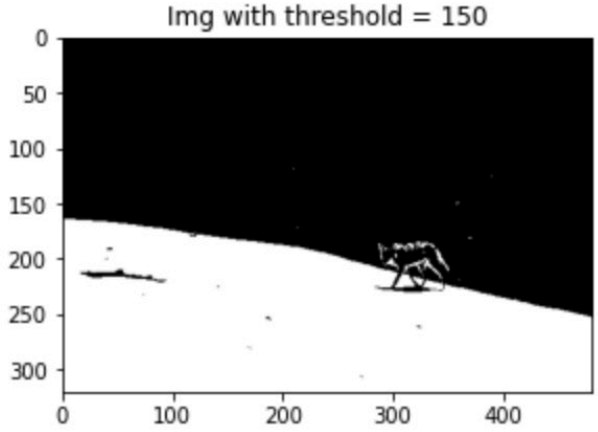


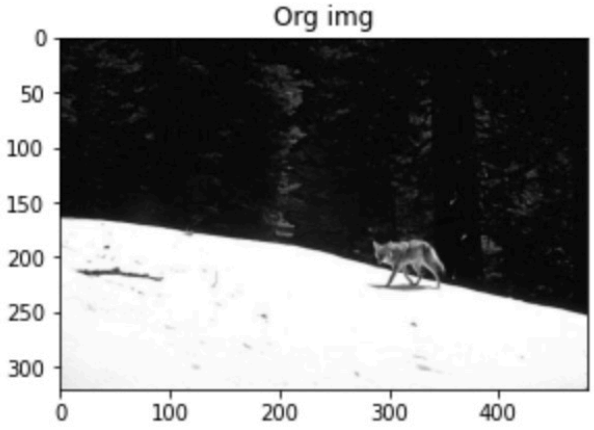
- The clear threshold seems to be around 150
- The image is clearly divided into two regions where all the dark pixels are located in 1 area and the light pixels are located in another.
- From the histogram we can see that these two intensities are located at the either end of the intensity spectrum.
- Images in next page


Org img
0
50
100
150
200
250
300
0
100
200
300
400


Img with threshold = 75
0
50
100
150
200
250
300
0
100
200
300
400


Org img
0
50
100
150
200
250
300
0
100
200
300
400


Img with threshold = 150
0
50
100
150
200
250
300
0
100
200
300
400


Org img
0
50
100
150
200
250
300
0
100
200
300
400

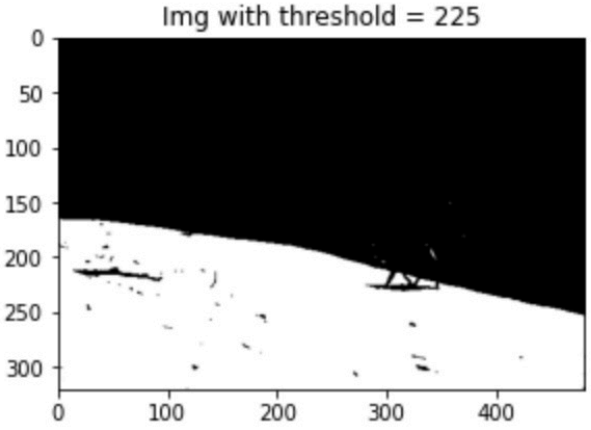
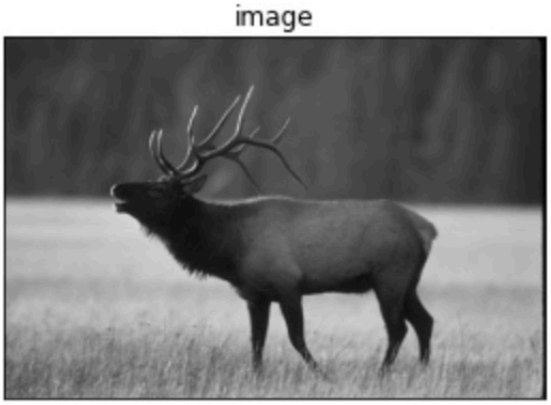
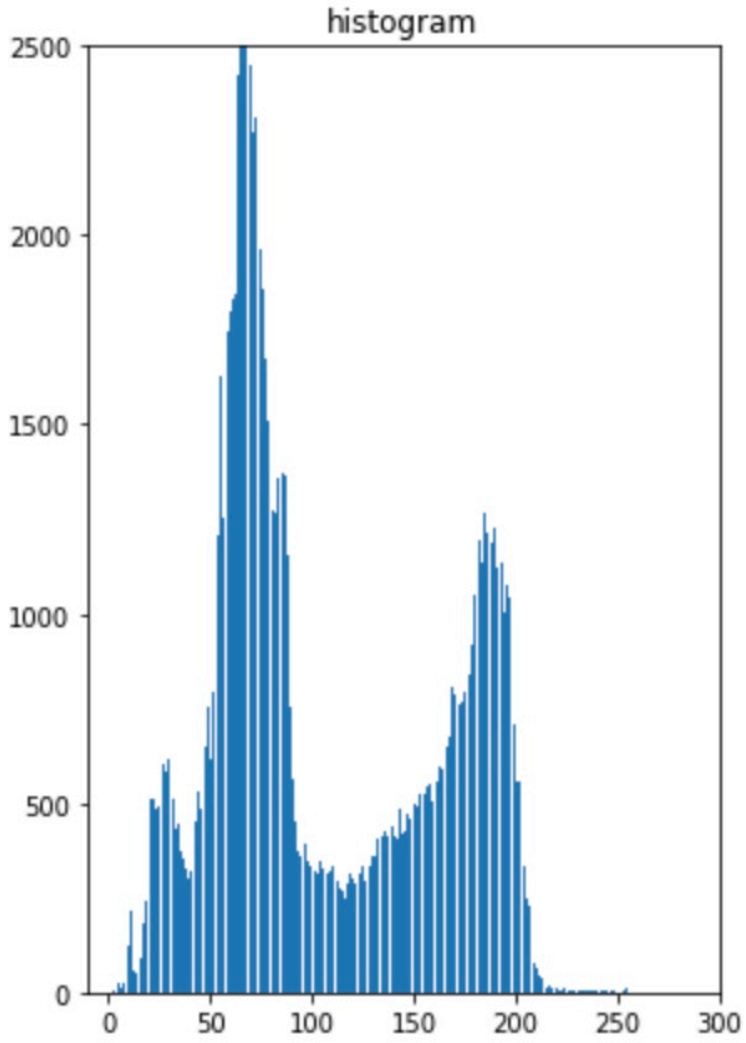
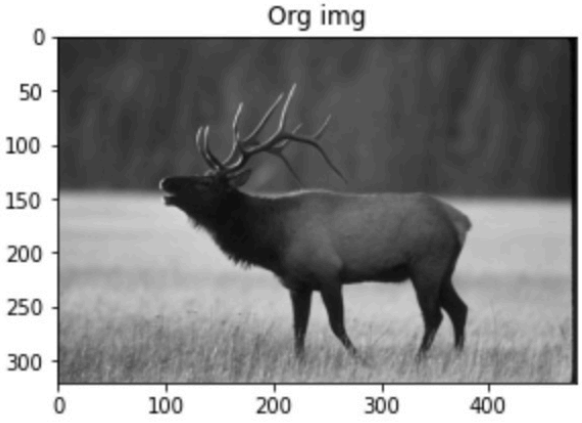

Img with threshold = 225
0
50
100
150
200
250
300
0
100
200
300
400

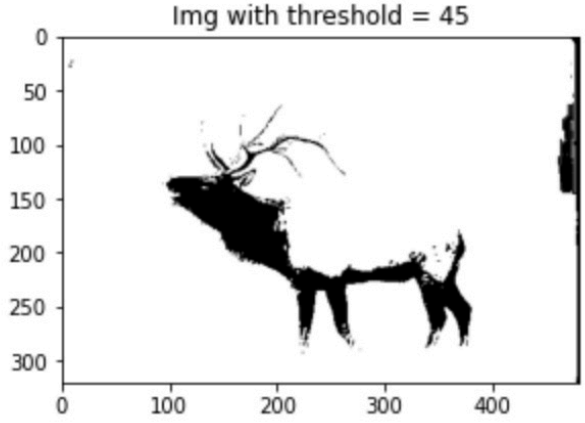
Image 3

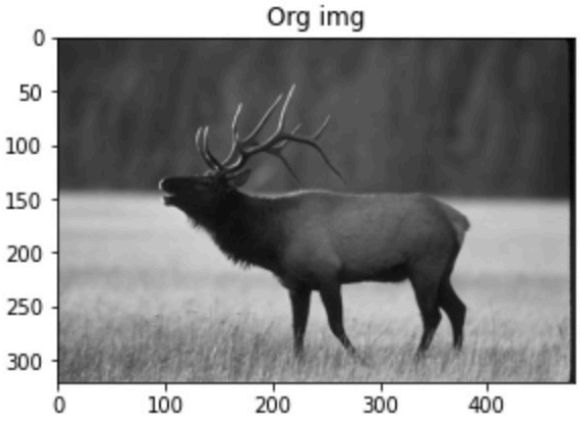


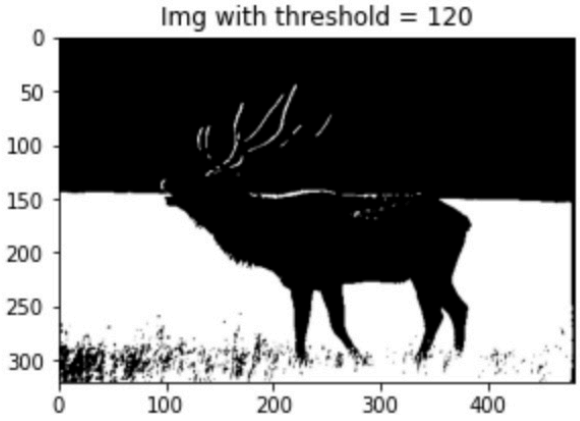


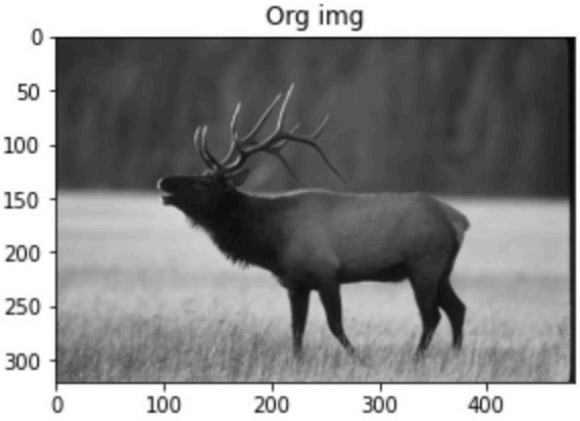
A good threshold seem to be around 120

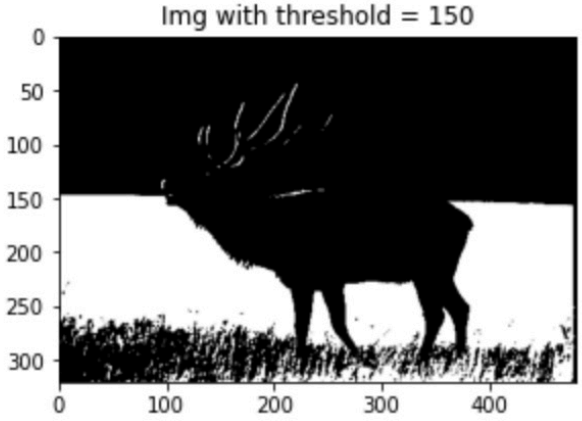


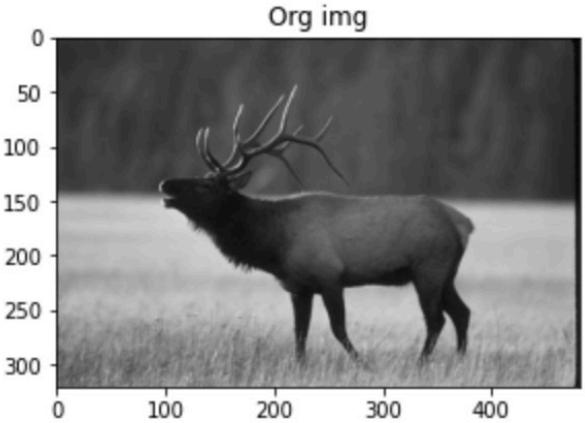


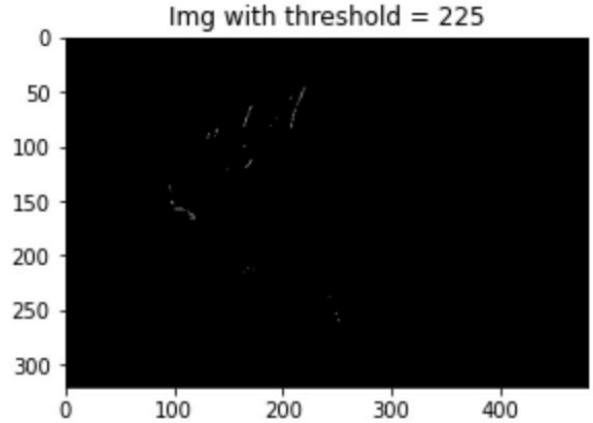

Org img
0
50
100
150
200
250
300
0
100
200
300
400


Img with threshold = 120
0
50
100
150
200
250
300
0
100
200
300
400

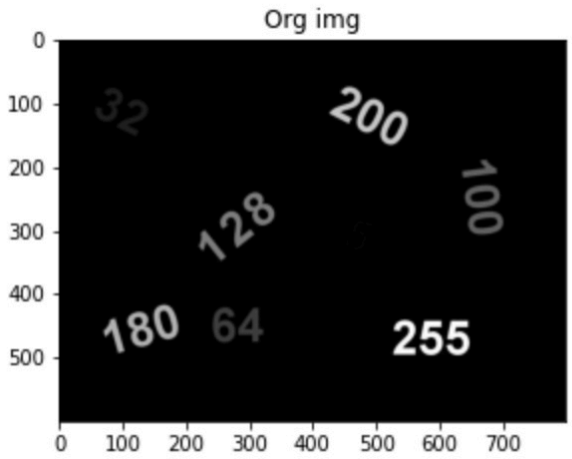

Org img
0
50
100
150
200
250
300
0
100
200
300
400

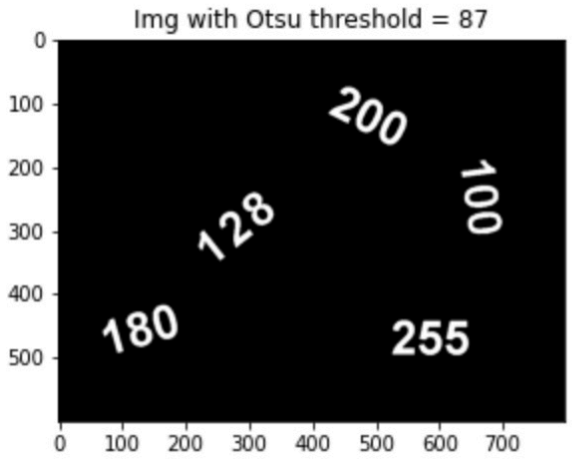

Img with threshold = 150
0
50
100
150
200
250
300
0
100
200
300
400

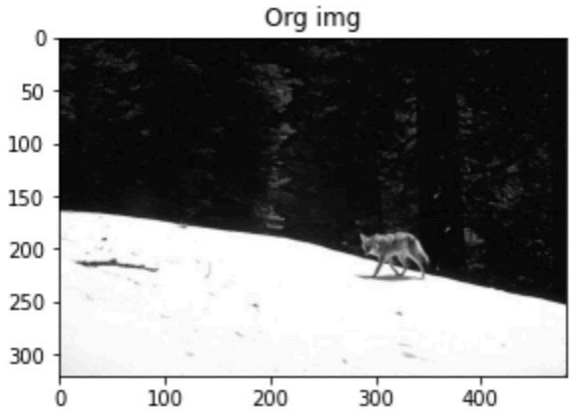

Org img
0
50
100
150
200
250
300
0
100
200
300
400

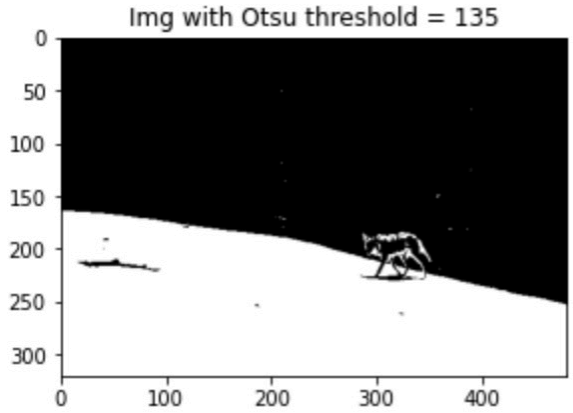

Img with threshold = 225
0
50
100
150
200
250
300
0
100
200
300
400

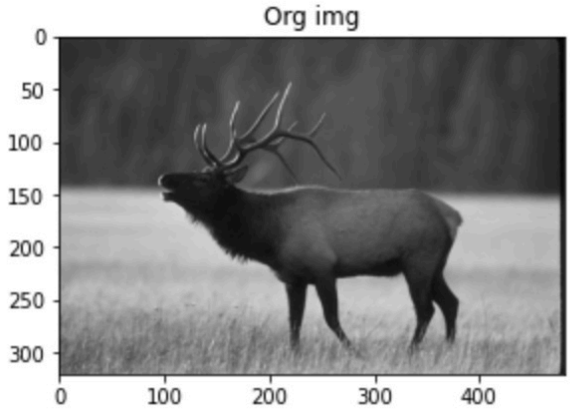
Otsu Thresholding

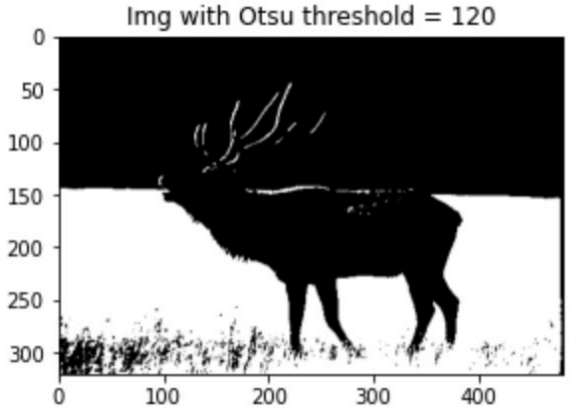


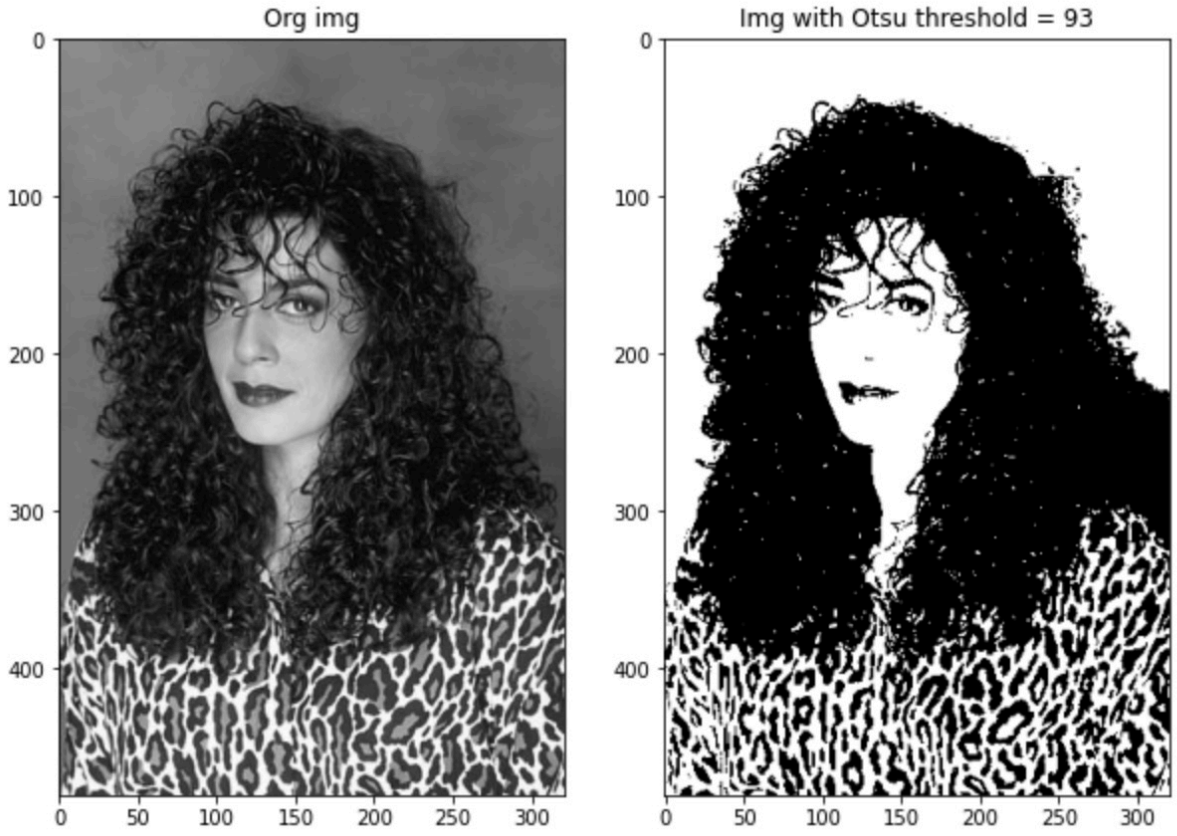












- Otsu thresholding has found the best threshold for each image.
- These threshold values are closer to what I have manually selected after visual inspection of the respective histograms.