HW5 Grabcut

Submitted by: Nafis Neehal (661990881)

Methodology:

- Import the image
- Import the text file containing all rectangles (Outer, Must background, Must foreground)
- Resize to 500x500
- Define outer rectangle
- Apply cv2.grabCut() for the first time -
  - Mask – all with zeros
  - Rect – outer rectangle
  - bgdModel, fgdModel – internally used matrices
  - Init method - cv2.GC_INIT_WITH_RECT
- Once, this has been applied, we get the mask in return for this.
- We modify our desired "Must foreground" and "Must background" regions in this Mask
- Now we run cv2.grabCut() for the second time –
  - Use altered mask with Must foreground and backgrounds
  - Rect – parameter will be "None"
  - Init method - cv2.GC_INIT_WITH_MASK
- Alter the new mask –
  - If Mask = 0 or 2 – convert to 0 (background)
  - If Mask = 1 or 3 – convert to 1 (foreground)
- Multiply the image with final mask for segmentation
- Draw all the rectangles before writing the images
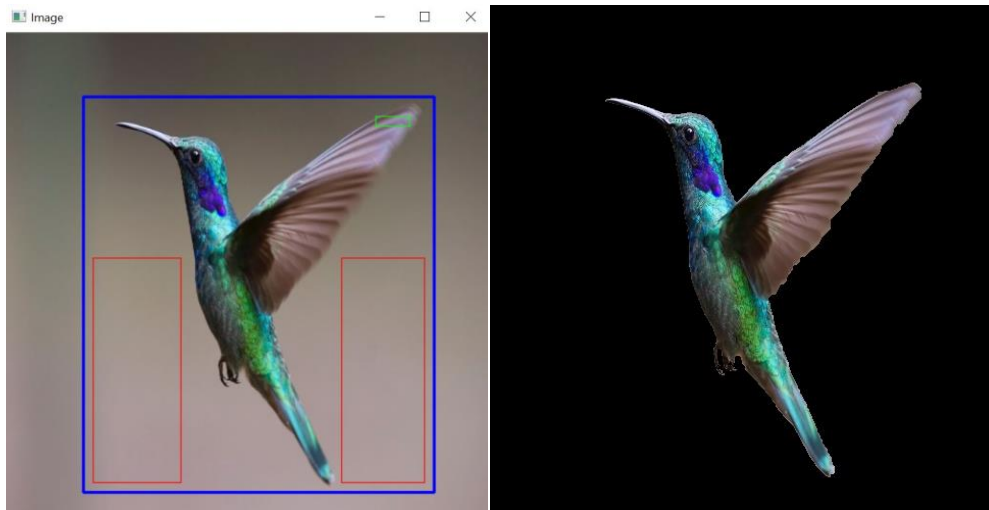- Output the images

Test Case 1:

Original Image

Foreground to make - bird

Discussion: This is image is the first one I considered for Grabcut. This is the easiest one to segment. This image has only one foreground object and only one background object (blurred, free from distraction).

Issue faced: While, this image being the easiest to segment, the issue I faced while segmenting is to segment the wings in the top-right corner of the image. It took a lot of effort to calculate the exact "Must Foreground" rectangle for this wing segment.

*Images with Rectangle (Red – Must Background, Green Must Foreground) in Left

*Final Segmented Image in Right

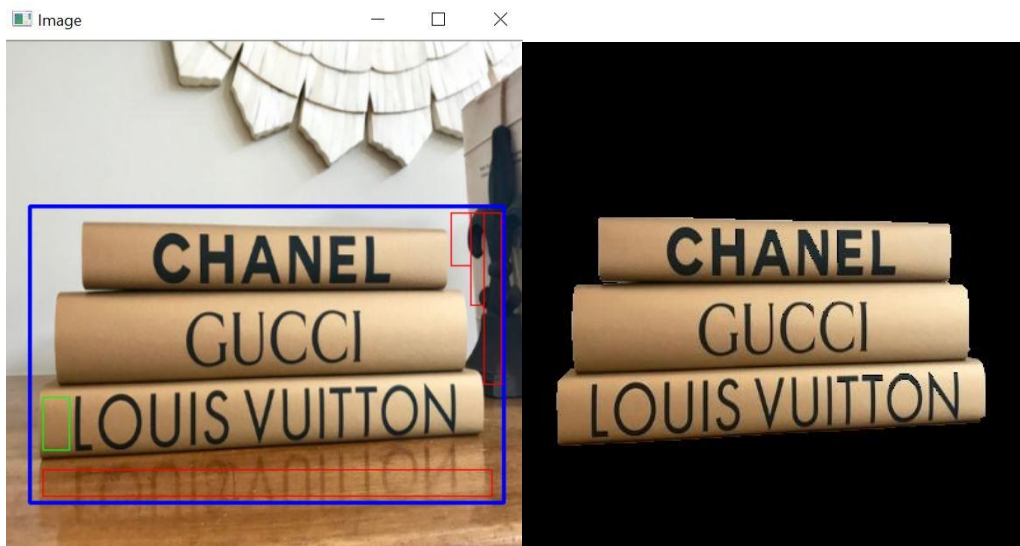## Test Case 2:

Original Image:

Foreground to make – Books

Discussion:

This image was certainly harder to segment for books compared to the first one. Because, the background is not nicely discreet and blurred now. Background now has lot of objects and distractions, the object I want to segment is also attached to another object with almost same color texture. So, I had to manually define several background segments – (Wall, Black Object, table etc.) and also a portion of the book (bottom-left corner) to keep the edge of the last book. But at the end, the image was segmented nicely.

*Images with Rectangle (Red – Must Background, Green Must Foreground) in Left

*Final Segmented Image in Right

Test Case 3:

Original Image:

Foreground to make – Human

Discussion: This image was impossible to segment. Mainly because –

1. The foreground texture is not uniform, every foreground object has different color texture (clothes, boots, relative height etc.)
2. Background and foreground objects are blended (we have backgrounds inside foreground object boundaries and vice-versa)

I even tried manually to put "Must foreground" boxes around each person, even then it won't work well.