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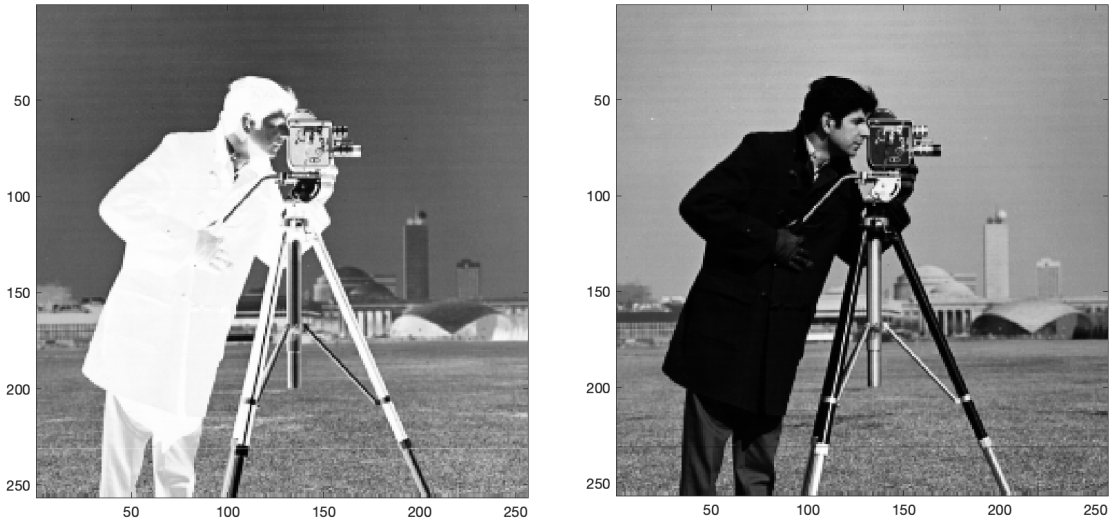
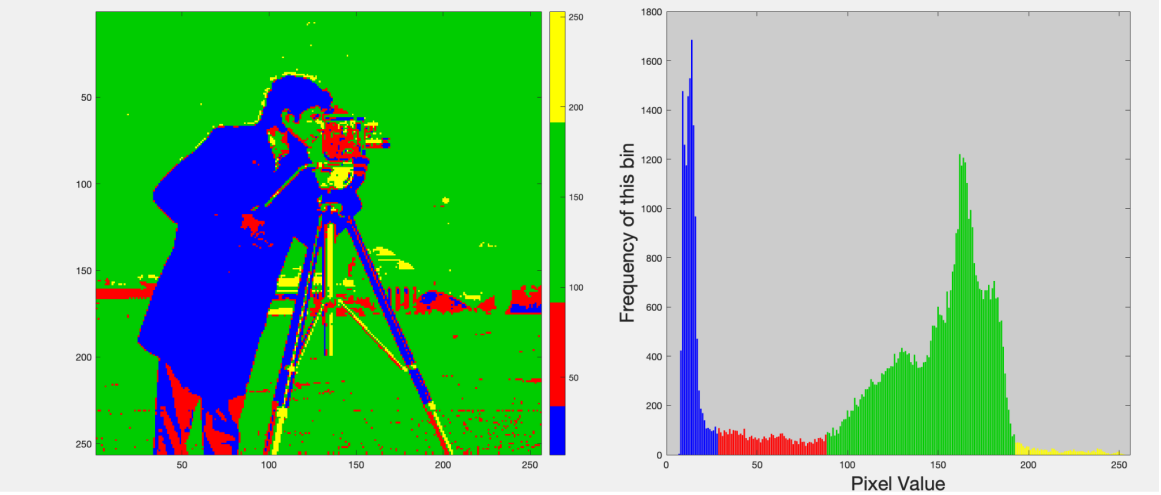
1. MATLAB Version: 9.13.0.2126072 (R2022b) Update 3
   MATLAB License Number: 364896

2. We are now able to better see the parts that were hidden in the shadows in the image. The edges of the jacket which were originally too dark are now perceptible. We can also see the buttons on the jacket (black dots) which were originally hidden



   in the shadows. The earlier white dots in the sky can now be spotted as black dots.

3. A histogram groups numeric data into ‘bins’ or ‘buckets’ and is created using the ‘histc’ function. In this question, it calculates the frequency of different pixel values in the image. Then, modifying the colormap of the image gives different colours to different ranges of pixel values, which is why we see certain parts of the image in red, blue, green and yellow. The lowest pixel values were assigned blue, while the highest values were assigned yellow, with red and green in between.



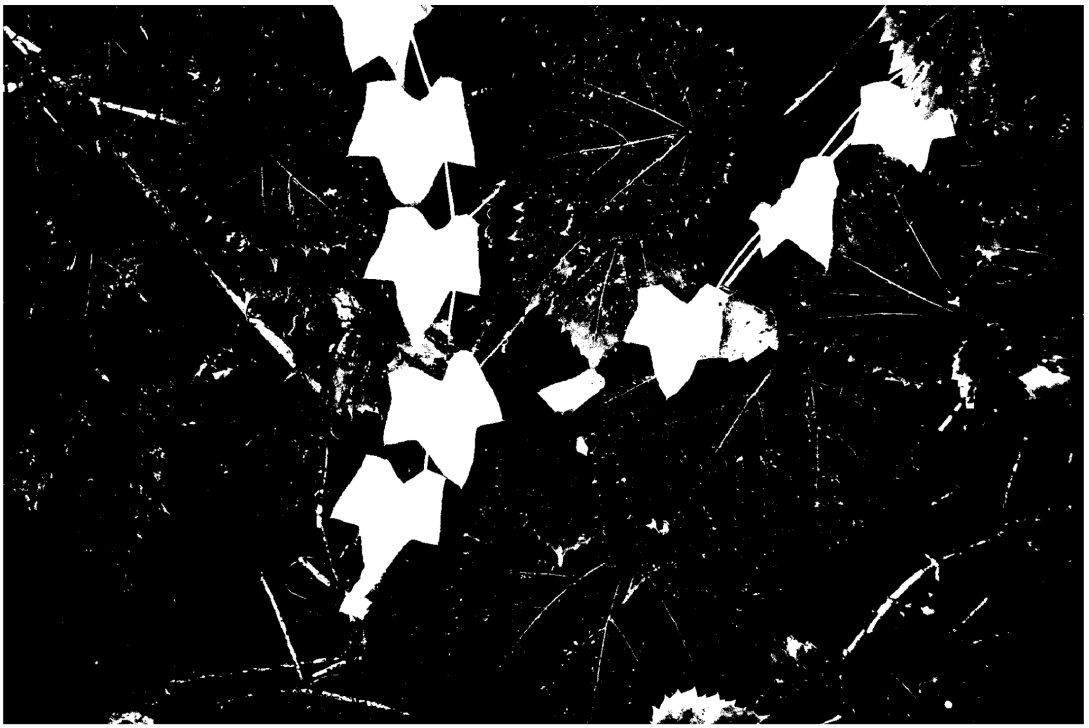
4. Threshold chosen for binary segmentation = 0.55

The function **‘graythresh’** chose a threshold of 0.3647, which gave a half-decent result. The flower appeared white, but a lot of the surrounding grass leaves were also white.

In order to obtain a better result, I raised the threshold from 0.3647 slowly and incrementally, while viewing the resulting image. After a few tries, I chose 0.55 as the threshold value for a better result than what we got with **‘graythresh’.**

5. To be able to see both the sign hidden in shadows and the sign that is visible, I used histogram equalization. Function **‘histeq’** can be used for this.

6. To make the Ivy white and grape leaves black, I took a sub-sampled version of the green channel as gray and then used the binary segmentation technique with a threshold value of 0.45. The result is pasted below:



7. **WORST METHOD** : Compute yellowness (result below)

BEST METHOD : Red Channel (result below)

8. **CONCLUSION:**

Finding the version and license was straightforward and easy. Inverting the cameraman image allowed us to see some details in the shadows that were hidden in the original image, which was very surprising and counter-intuitive. Being able to use a histogram with different ranges of pixels is a good technique to separate out and view different pixels in any image.

Finding the right threshold for binary segmentation was tedious because the graythresh function did not find a perfect value. Instead I had to try out various values to find the right balance between background and foreground. In the Ivy-Grape vine task, I first tried to use inversion but that failed to give me the desired output. However, I was able to complete the task on the second try using the binary segmentation technique.

The rest of the questions were simple and straightforward techniques/functions. However, I would also like to read more and understand what exactly the ‘histeq’ function does behind the scenes.