MODULE 4

Your grade: 88.88%

Your latest: **88.88%** • Your highest: **88.88%** • To pass you need at least 80%. We keep your highest score.

Next item →

Instructions

Before attempting this assignment, we recommend you complete the previous code project and have MATLAB open. This assignment will include several questions about your results and require you to use MATLAB.

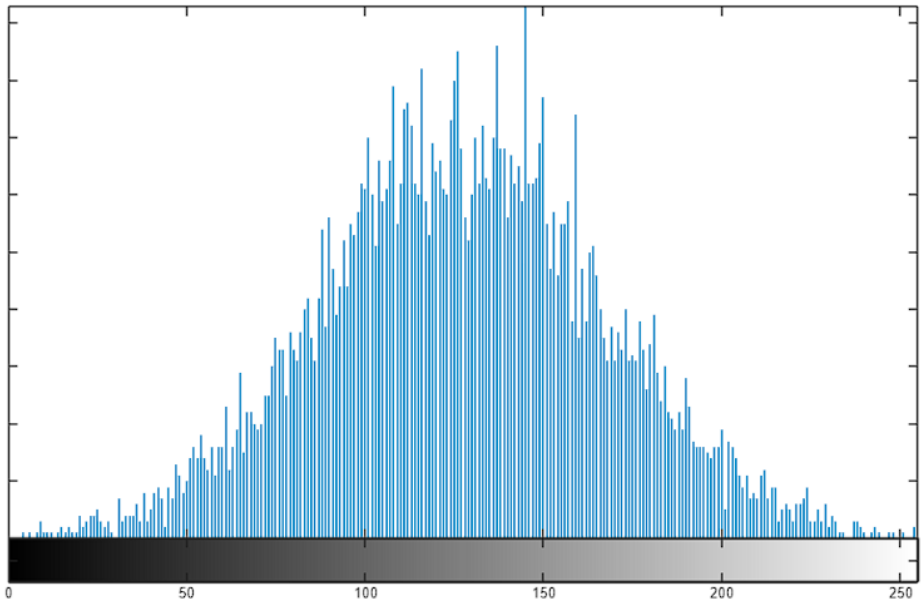
1. When is histogram stretching a good approach to try to improve image contrast? 1 / 1 point

- (●) When the image histogram does not use the full range of available pixel values.

  Stretching the histogram is often a good approach to try with these images.

- ( ) Histogram stretching is often effective on dark images but will not help improve images that are already bright.
- ( ) Histogram stretching will always brighten an image and should be tried.

2. Assume you have an image with the histogram shown below. The full range is used, but small details are hard to distinguish since most pixels are clumped near the middle of the pixel range. What approach might help bring out more details? 1 / 1 point



- (●) Histogram equalization

  Histogram equalization will spread out the pixel values more evenly, increasing the contrast of objects with pixel intensities in the middle of the range.

3. In the video, Adjusting Image Contrast, you saw that histogram stretching, followed by adaptive histogram equalization, gave the best results for the ankle X-ray. Which explanation below best explains why this was the case? 1 / 1 point

- ○ Histogram stretching did not have much effect, and most of the result was due to adaptive histogram equalization.
- ○ Histogram stretching added a constant value to all pixel values to make them brighter, and adaptive histogram equalization increased the contrast in small subsections of the image.
- ○ Combining techniques is not recommended because it changes the image too much.
- ◉ Stretching the histogram forced the pixel values to use the entire range of possible values. Adaptive histogram equalization then spreads the pixel intensities evenly over smaller sections of the image.

4. Why is it recommended to convert a color image to the HSV color space for contrast adjustment? 1 / 1 point

- ○ Converting to HSV also converts the datatype to double, which is more effective for contrast adjustment computations.
- ◉ In the HSV color space, the Value channel changes the brightness of the image with minimal effect on color.

  Changing the Value channel adjust the intensity of the image.

- ○ Contrast adjustment functions in MATLAB, like `imadjust`, expect an HSV color image as input.

5. In the project, you converted the color image to the HSV color space and used the `imadjust` function on the Value channel to adjust the contrast. This approach did not have much effect on the brightness of the image. Why? 1 / 1 point

- ○ The "boston night.jpg" image is a color image and, therefore, is not suitable for the `imadjust` function.
- ○ HSV is not a good color space for contrast adjustment for this image because it is so dark.
- ◉ Though most of the image is dark, the histogram uses the full range of possible pixel values. Therefore, histogram stretching had a minimal effect on the image.
- ○ The Value channel does not affect the brightness of the color image. Instead, the Saturation channel should be used.

6. What reason below best explains why histogram equalization using the `histeq` function was not a good approach for this image? 1 / 1 point

- ○ HSV is not a good color space for adjusting the contrast with this image because it is so dark.
- ◉ The vast majority of pixel values were very small. So, making an equalized histogram on the entire image made dark regions much too bright.
- ○ The "boston night.jpg" image is a color image, and therefore not suitable for the `histeq` function.

7. Which explanation below best describes the difference between your gamma-corrected image and adaptive histogram equalization image? 1 / 1 point

- ◉ Gamma correction was a global operation, meaning it was applied the same way to every pixel in the image. The adaptive histogram equalization varied based on the pixel values of a local area.

  Gamma correction was applied the same way for every pixel in the entire image. Adaptive histogram

The adaptive histogram equalization image is better than the gamma-corrected image.

8. Change the value of γ in your `imgGamma` image from 0.5 to 1.3. What difference do you see? 1 / 1 point

- (●) The image with $\gamma = 0.5$ is much brighter than with $\gamma = 1.3$.
- ( ) γ correction does not have an effect on color images.
- ( ) The image with $\gamma = 1.3$ is much brighter than with $\gamma = 0.5$.

9. Included in the course files is an image named "picks.jpg" 1 point

Load this image into MATLAB and use any contrast adjustment technique you've learned to make the guitar picks more visible.

How many guitar picks are present in "picks.jpg"?

6

⊗ You'll need to brighten the image to see the picks.