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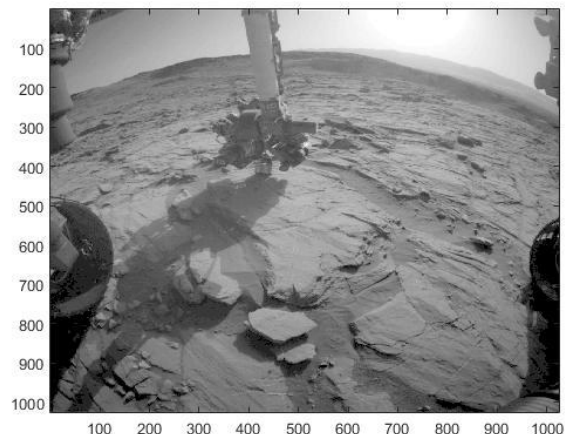
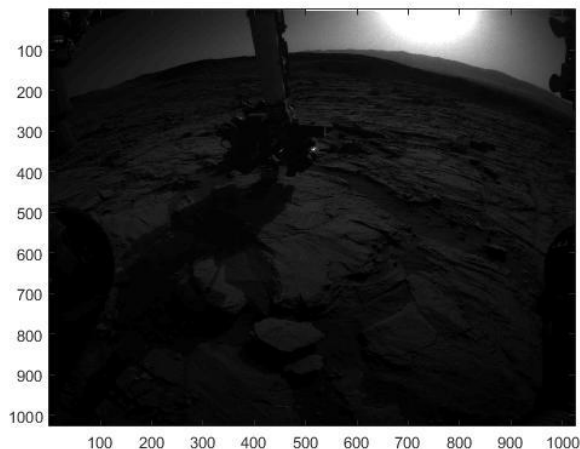
Lab 4 Writeup

In this lab, I enhanced images that were originally extremely low intensity, and had barely any visible features in them and applied contrast stretching operations as well as a histogram equalization operation.

These operations were very useful in enhancing the images to see what they were in there. The following are descriptions and examples of what I did:

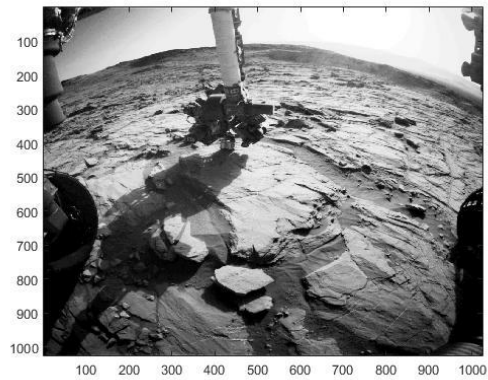
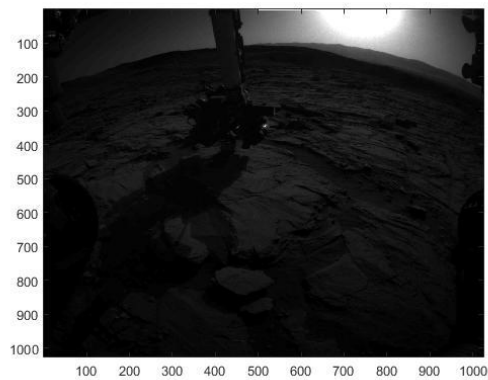
Contrast Stretching

By looking at the histogram of an image, one can see the intensity distributions of specific shades of gray in a grayscale image. If for example an image has a large percentage of its intensity in the lower intensity section of its histogram, that means that the image is primarily dark and not a lot would be visible in it. By taking the section that contains most instances of intensities and remapping them in the histogram to span a wider range of intensities the image will be greatly enhanced. Here are samples of the difference after a contrast stretching has been done:



Histogram Equalization

This is a bit simpler operation that takes the original histogram and normalizes the values of intensities but does not take a specific section of the histogram, instead it takes statistical information about the image and uses it to find the best “normalized” distribution of intensities. This will sometimes be affected due to outliers and at times, may not yield the best results in terms of enhancement because of these outliers. Examples are the following:



The results were very interesting; it is actually amazing how we can enhance images with MATLAB with great ease. The original images were absolutely dark and nothing could be seen from them. In the case of the Martian images, I really found cool the sort of mud-crack looking features on the surface. Also looking at the desert pavement of Mars, one can see very well that Aeolian processes also work even in a completely different atmosphere.