ECE 5256

Project 1: Reading and displaying an image, basic operations

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1 Determining Method To read in Image

Firstly with the project, I figured out how to read in an image in MATLAB. I used the imread function to do this. It gave me no problems and will be used for the remiander of this project.

2 Read in Image and Display it

Once I read in the image, I used imshowsc to display the image with 32 intensity levels by passing the function an array for the limits I wanted. Next, I repeated this procedure for 255 intensity levels. Each time I displayed the image with the gray color map and axes turned off and set to image.

Figure 1: Image Displayed with 32 levels

Figure 2: Image Displayed with 255 levels

The next portion of this project dealt with the color maps used to display the image. The first color map I tried in addition to gray was called lines. With this colormap, it was hard to see any of the original image as the colormap is just blocks of color and is not linear. The next one I used was "turbo." This colormap was able to display the image.

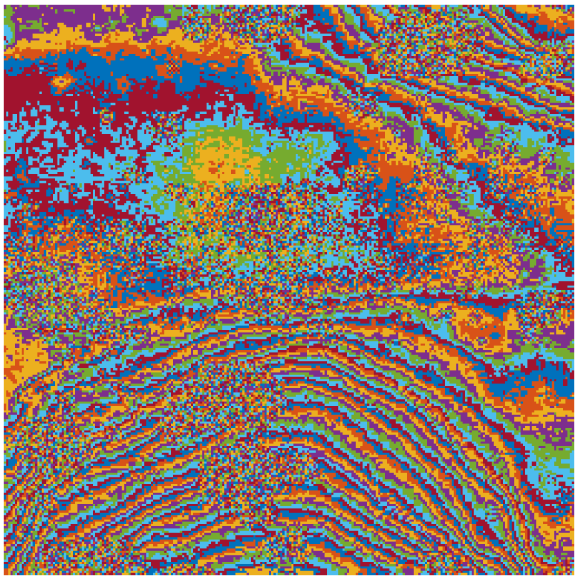

Figure 3: Image dsiplayed with 255 levels and the Lines colormap

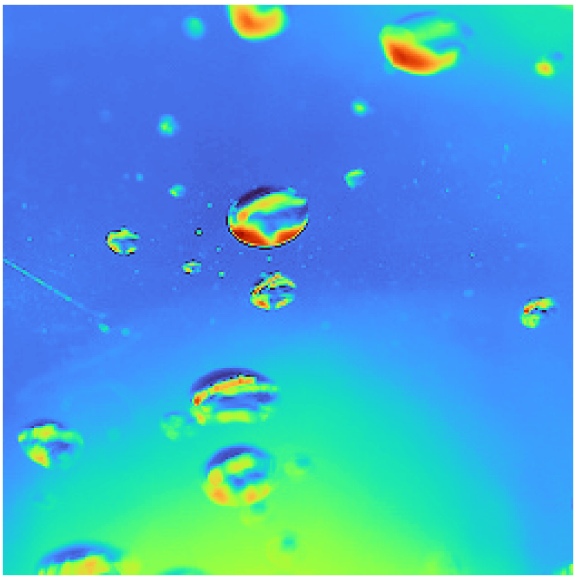

Figure 4: Image dsiplayed with 255 levels and the Turbo colormap

3 Averaging for Noise Reduction

The third portion of this lab dealt with noise reduction using averaging. To simulate noise, I created an array of Gaussian random numbers with a mean and standard deviation of 20. The code then added this noise array to the original image. This process was repeated 1, 5, and 10 times. For each of these, the code then calculated the mean squared error (MSE). I then plotted the $\sqrt{MSE}$

vs. N. As N increases, $\sqrt{MSE}$ decreases.

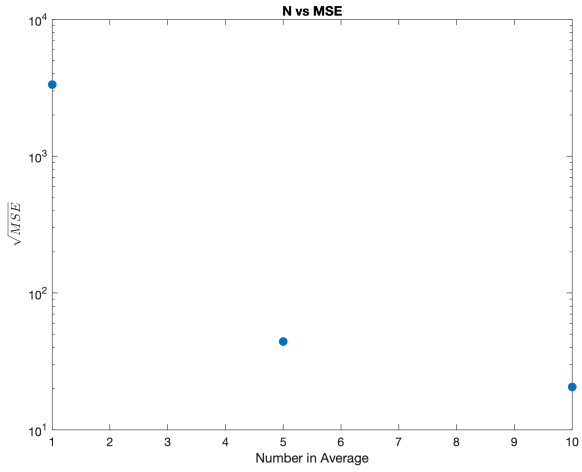

Figure 5: Graph of the amount of noisy images averaged verses $\sqrt{MSE}$

4 Image Transforms

The final part of this project was to do two affine transforms one rotation and one scaling. I did this by creating the transform matrices for each of the individual affine transformations, one for rotation and the other for the scale. I then multiplied them together to get the total transformation. The order was a scale and then rotation. This transform was then applied to the image using the affinetform2d and imwarp commands.

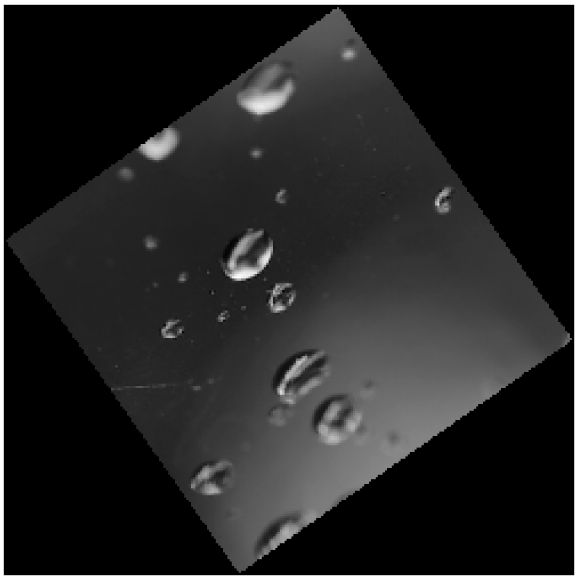

Figure 6: Image after a 35