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Project 0 Lab Report

1.

The first exercise of this project was to perform a few simple numpy operations in Python. I implemented the first 3 functions to generate an array with arange, perform a dot product, generate a 2x2 matrix, perform another dot product, then generated another 10x10x3 matrix and performed a dot product once again.

```
C:\dev\college\CS6640\.venv\Scripts\python.exe C:\dev\college\CS6640\dipCode\project0\main.py
Question 1.a: Correct!
Question 1.b: Correct!
Question 1.c: Correct!
```

2.

The second exercise of the project was to perform some simple IO on images. I utilized Python's os library to locate files in a folder named images, read in each file as an image, converted the images to grayscale using the weights from question 1.c, then displayed and saved all the images as a matplotlib grid.

During testing of the code I noticed the tiff file required another package that was not required by the skimage library, the imagecodecs package. So I had to install that package. Additionally, one of the images was already in grayscale, which I found I could detect by checking the dimension of the resulting matrix from the ski.io.imread function. Once I determined the image had color, I performed a dot product with the weights the project required (0.3, 0.6, 0.1), converting the image to grayscale as the dimension of the resulting matrices are transformed from 3D to 2D by the dot product.

Finally, using the subplots function I created a figure with 4 axes objects. Using the imshow function on the images showed first grid below. Upon more reading in the documentation, the imshow function by default treats the input matrix as RGB, and since the matrix was 2D the red color was omitted. Adding the cmap = 'gray' parameter was required for the function to interpret the matrix as grayscale data and resulted in the second image grid below.

I changed the grayscale weights to see if that had an effect on the images. It appeared that it had minimal effect, unless I changed all the values to 0, which created just black images.

Figure 1

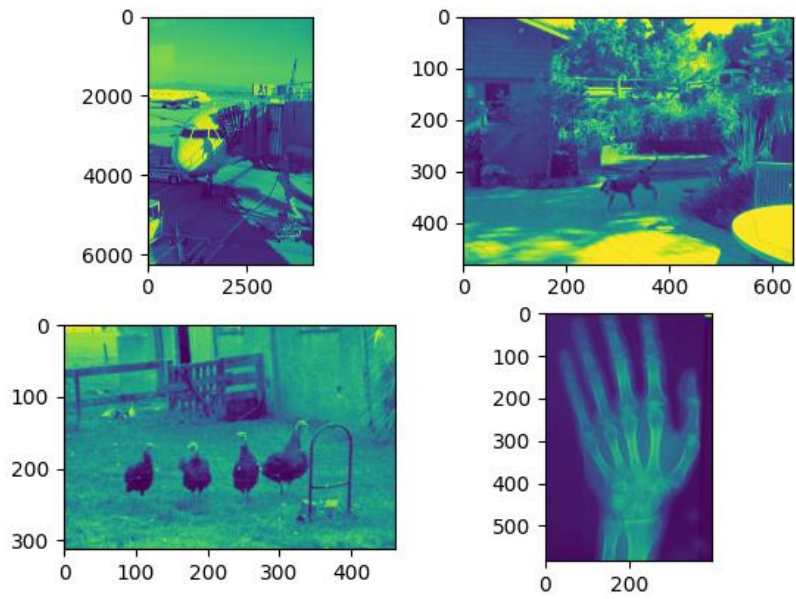
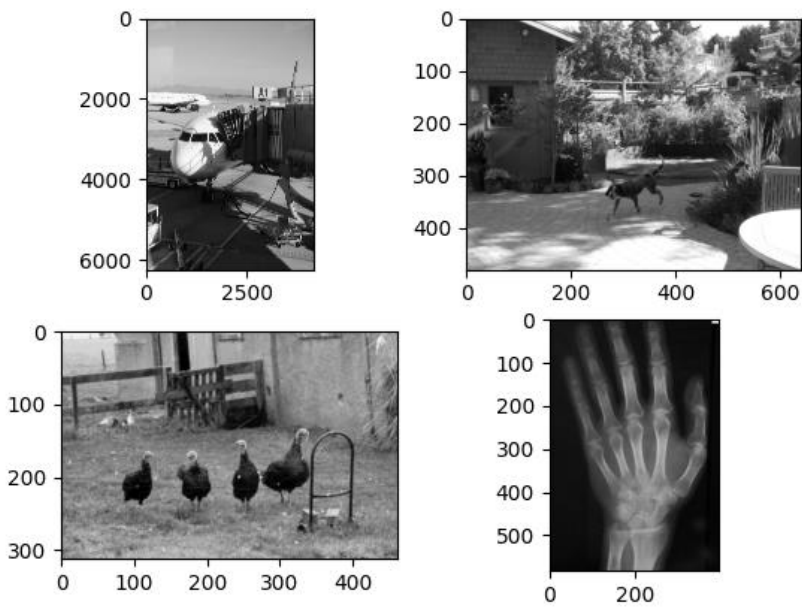


Figure 1



References to documentation I utilized:

<https://scikit-image.org/docs/stable/api/skimage.io.html>

https://matplotlib.org/stable/api/_as_gen/matplotlib.axes.Axes.imshow.html#matplotlib.axes.Axes.imshow