CS 6476: Computer Vision, PS0, 8/21/19

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1

B

1. Done.

2. (a) This returns an array of length 1000 with digits 0-999 inclusive in a random order.
   (b) This defines a as a 3x3 matrix, with row 1 containing [1, 2, 3], row 2 containing [4, 5, 6], and row 3 containing [7, 8, 9]. It then defines b as the row at index 2 and all columns of array a, or [7, 8, 9].
   (c) This defines a as in part b above. It then defines b as a flattened, 1-d version of a, or [1, 2, 3, 4, 5, 6, 7, 8, 9].
   (d) This defines f as a 5x1 matrix made up of floating point numbers drawn at random from a Gaussian distribution with mean 0 and standard deviation 1. It then defines g as a 1-d array made up of all elements from f that are greater than 0.
   (e) This defines x as a 1-d array of length 10 populated with 0s. It then adds 0.5 to each element. y is defined as a 1-d array the length of x, which is 10, populated with 1s. It then multiplies each element by 0.5. Finally, z is a 1-d array of length 10 of the sums of x and y, so each element has a value of 1.
   (f) This defines a as a 1-d array of length 99 with elements starting at 1, inclusive, and going to 100, exclusive, in increments of 1. b is then defined to be the reverse of a, so the elements count down from 99 to 1.

3. (a)
```
import numpy as np

def roll_dice(N):
    return np.ceil(np.random.rand(N) * 6)
```

   (b)
```
y = np.array([1, 2, 3, 4, 5, 6])
z = y.reshape(3, 2)
```

   (c)
```
x = np.max(z)
r, c = np.where(z == x)
```

   (d)
```
v = np.array([1, 8, 8, 2, 1, 3, 9, 8])
x = len(np.where(v == 1)[0])
```

4. (a)

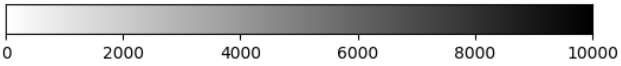

Figure 1: Plot of Decreasing Intensities of Matrix A

(b)

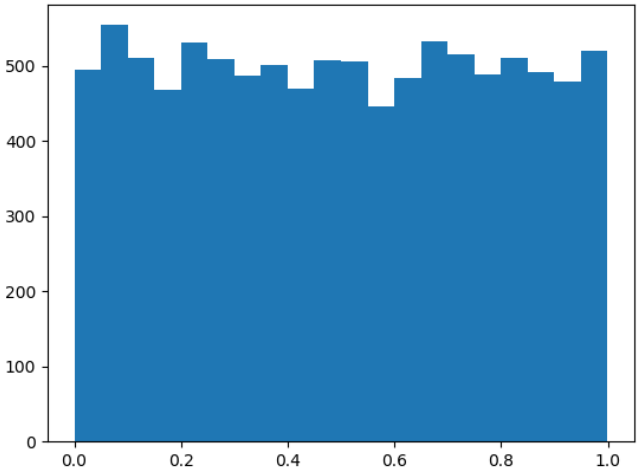

Figure 2: Histogram of Intensities of Matrix A, 20 bins

(c)

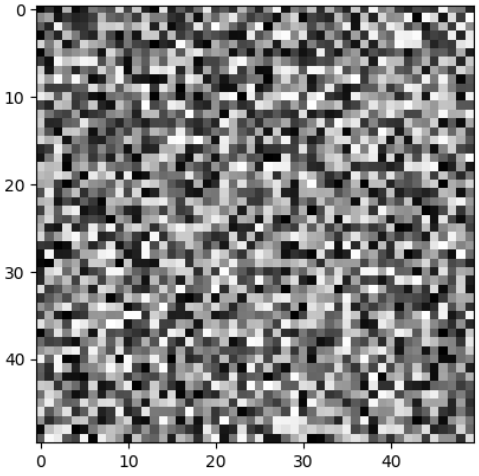

Figure 3: X = Bottom Left Quadrant of Matrix A

(d)

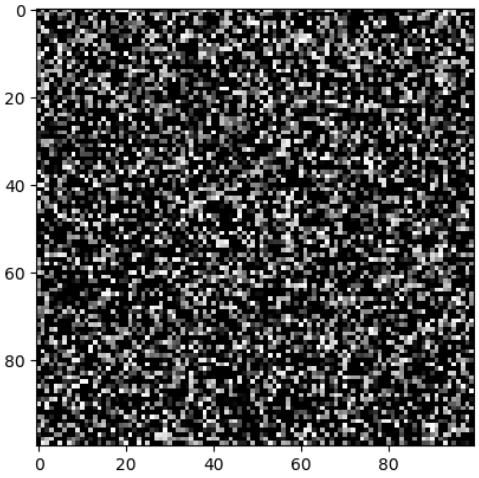

Figure 4: Y = A minus Mean Intensity

(e)

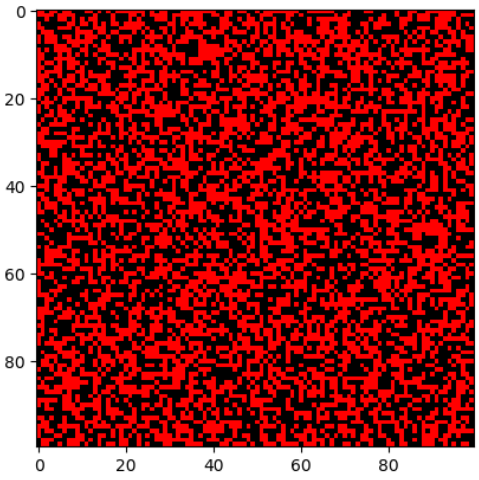

Figure 5: Z = Image where Red Channel=1 if Greater Than Mean Intensity of A

2

Figure 6: Original Image

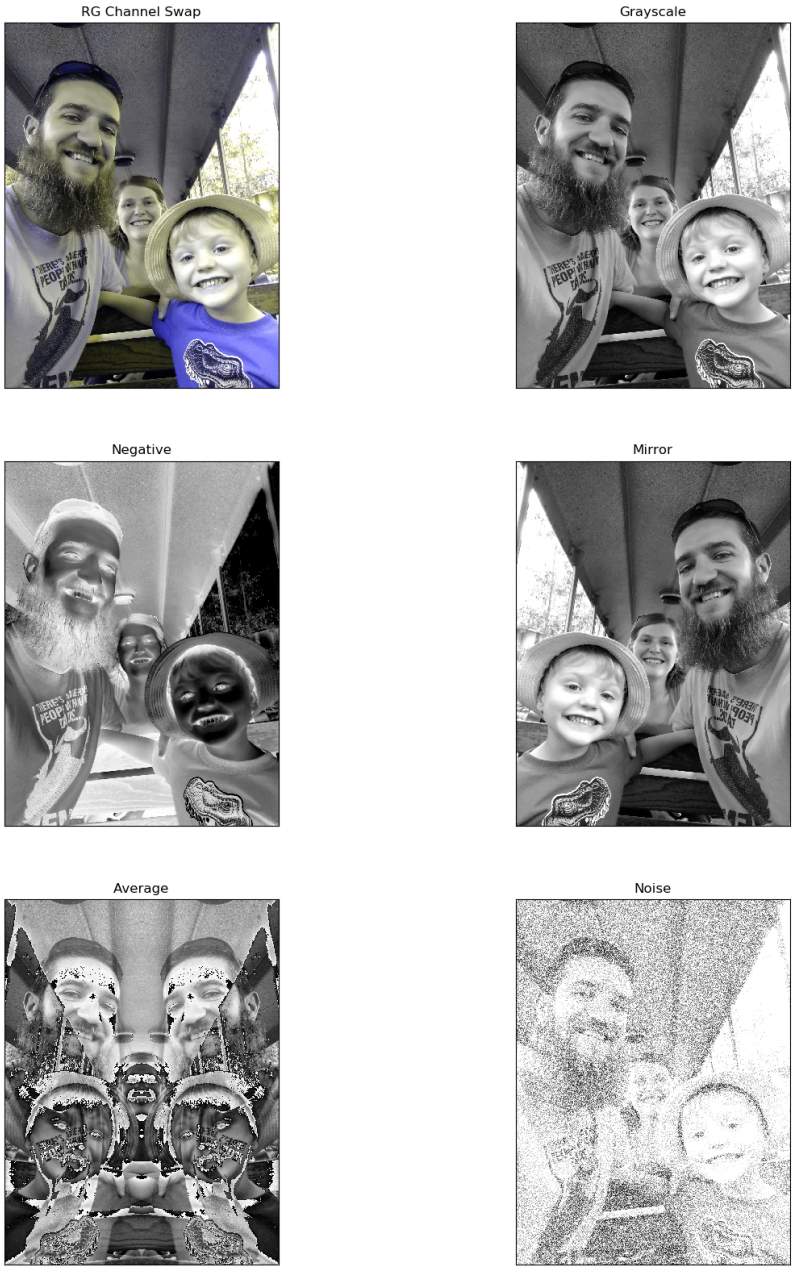

Figure 7: Transformations of Original Image