# ECE 5554 SU22 - Dr. Jones - HW1

#### **Part 2:**

Animals img size: (768, 1024, 3)

Stonehenge img size: (768, 1024, 3)

Part 3:

Animals red avg: 92.87458928426106

Animals green avg: 100.50979868570964

Animals blue avg: 128.48477045694986

Stonehenge red avg: 92.87458928426106

Stonehenge green avg: 100.50979868570964

Stonehenge blue avg: 128.48477045694986

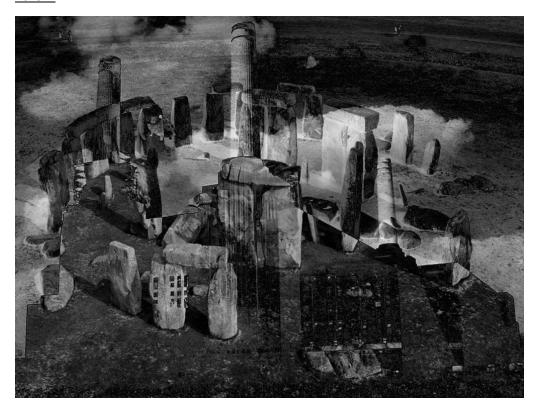
#### <u> Part 5:</u>



### <u> Part 6:</u>



<u>Part 7:</u>



## Code

## Homework1.py:

```
import cv2
import numpy as np
#%%
# Part 1
animals = cv2.imread("animals.png")
# Part 2
height = len(animals)
width = len(animals[0])
depth = len(animals[0, 0])
print(f"Animals img size: {animals.shape}")
# Part 3
animals_red = animals[:,:,2]
animals_green = animals[:,:,1]
animals_blue = animals[:,:,0]
print(f"Animals red avg: {np.mean(animals red)}")
print(f"Animals green avg: {np.mean(animals_green)}")
print(f"Animals blue avg: {np.mean(animals_blue)}")
#%%
# Part 1
stonehenge = cv2.imread("Stonehenge 1024x768.png")
# Part 2
```

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height = len(stonehenge)
width = len(stonehenge[0])
depth = len(stonehenge[0, 0])
print(f"Stonehenge img size: {stonehenge.shape}")
# Part 3
stonehenge red = stonehenge[:,:,2]
stonehenge_green = stonehenge[:,:,1]
stonehenge_blue = stonehenge[:,:,0]
print(f"Stonehenge red avg: {np.mean(animals red)}")
print(f"Stonehenge green avg: {np.mean(animals green)}")
print(f"Stonehenge blue avg: {np.mean(animals_blue)}")
#%% Pixel by Pixel Avg
def avg pixel by pixel(img1, img2):
  # Assuming both images are the same size
  height = len(img1)
  width = len(img1[0])
  new image = np.zeros((height, width), dtype = "uint8")
  for y_pix in range(height):
    for x pix in range(width):
      img1 value = img1[y pix][x pix]
      img2_value = img2[y_pix][x_pix]
      avg value = np.mean([img1 value, img2 value])
      new image[y pix, x pix] = avg value
  return new image
```

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# Part 4
animals grayscale = cv2.cvtColor(animals, cv2.COLOR BGR2GRAY)
stonehenge grayscale = cv2.cvtColor(stonehenge, cv2.COLOR BGR2GRAY)
# Part 5
avg image = avg pixel by pixel(animals grayscale, stonehenge grayscale)
# show images
cv2.namedWindow('INPUT', flags=cv2.WINDOW_NORMAL)
cv2.imshow('INPUT',avg_image)
cv2.waitKey(0)
cv2.destroyAllWindows()
cv2.imwrite("part5 img.png", avg image)
#%% Pixel by Pixel Max
def max pixel by pixel(img1, img2):
  # Assuming both images are the same size
  height = len(img1)
  width = len(img1[0])
  new_image = np.zeros((height, width), dtype = "uint8")
  for y pix in range(height):
    for x pix in range(width):
      img1_value = img1[y_pix][x_pix]
      img2 value = img2[y pix][x pix]
      max_value = np.max([img1_value, img2_value])
      new image[y pix, x pix] = max value
  return new image
```

```
# Part 6
max image = max pixel by pixel(animals grayscale, stonehenge grayscale)
# show images
cv2.namedWindow('INPUT', flags=cv2.WINDOW_NORMAL)
cv2.imshow('INPUT',max image)
cv2.waitKey(0)
cv2.destroyAllWindows()
cv2.imwrite("part6 img.png", max image)
#%% Pixel by Pixel Difference
def diff pixel by pixel(img1, img2):
  # Assuming both images are the same size
  height = len(img1)
  width = len(img1[0])
  new image = np.zeros((height, width), dtype = "uint8")
  for y_pix in range(height):
    for x_pix in range(width):
      img1 value = img1[y pix][x pix]
      img2 value = img2[y pix][x pix]
      diff_value = cv2.absdiff(np.array(img1_value), np.array(img2_value))
      new image[y pix, x pix] = diff value
  return new_image
```

```
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diff_image = diff_pixel_by_pixel(animals_grayscale, stonehenge_grayscale)

# show images

cv2.namedWindow('INPUT', flags=cv2.WINDOW_NORMAL)

cv2.imshow('INPUT', diff_image)

cv2.waitKey(0)

cv2.destroyAllWindows()

cv2.imwrite("part7_img.png", diff_image)
```