Assignment1 / {Filters}

Graphics Programming

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Input Image:

image1.png
“Bridal Veil Falls”
750x1000

Greyscale / {Pic_2_1}

- *Task:* Make image1 greyscale with 20/70/10 model.

image1.png

pic_2_1.png

Greyscale / {Pic_2_1} / [code]

```
1.  def greyscale(img):
2.      b = img[:, :,0]*0.1
3.      g = img[:, :,1]*0.7
4.      r = img[:, :,2]*0.2
5.      img=b+g+r
6.      return img
```

blackWhite / {Pic_2_2}

- *Task:* Make image1 black & white w/ threshold=128.

image1.png

pic_2_2.png

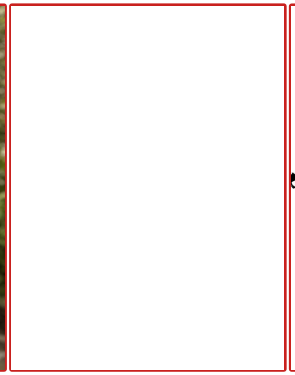
blackWhite / {Pic_2_2} / [code]

```
1.  def blackWhite(img, threshold):
2.      bw = 1*img[:,:,1]
3.      bw[np.uint8(bw) < threshold] = 0
4.      bw[np.uint8(bw) > threshold] = 255
5.      return bw
```

blackWhite / {Pic_2_2_n}

- *Task:* Use threshold -1 to 255 with increments of 32.


image1.png


pic_2_2_0.png


pic_2_2_1.png


pic_2_2_2.png


pic_2_2_3.png

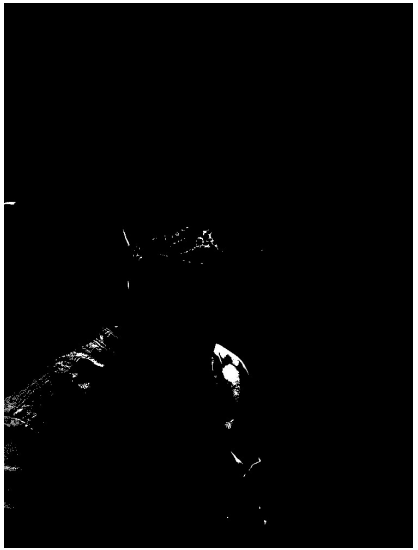

pic_2_2_4.png


pic_2_2_5.png

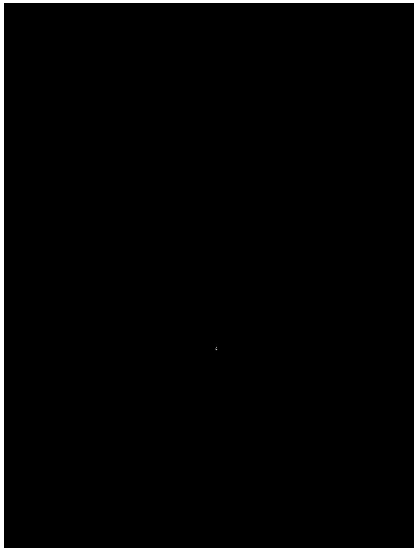
blackWhite / {Pic_2_2_n} / Cont.

- *Task:* Use threshold -1 to 255 with increments of 32.

pic_2_2_6.png



pic_2_2_7.png



pic_2_2_8.png

blackWhite / {Pic_2_2_n} / [code]

```
1.  # 2.2b Apply blackWhite filter using threshold values from -1 to 255 in increments of 32.
2.  for i in range(1, 9):
3.      pic_2_2b=blackWhite(img, (32*i)-1)
4.      cv2.imwrite("output/pic_2_2_" + str(i) + ".png", pic_2_2b)
```

Desaturate / {Pic_2_3_n}

- *Task:* Apply the desaturate filter 0 to 1, 0.1

image1.png
Original

pic_2_3_0.png
Desat: 0

pic_2_3_1.png
Desat: 0.1

pic_2_3_2.png
Desat: 0.2

pic_2_3_3.png
Desat: 0.3

pic_2_3_4.png
Desat: 0.4

pic_2_3_5.png
Desat: 0.5

Desaturate / {Pic_2_3_n} / Cont.

- *Task:* Apply the desaturate filter 0 to 1, 0.1

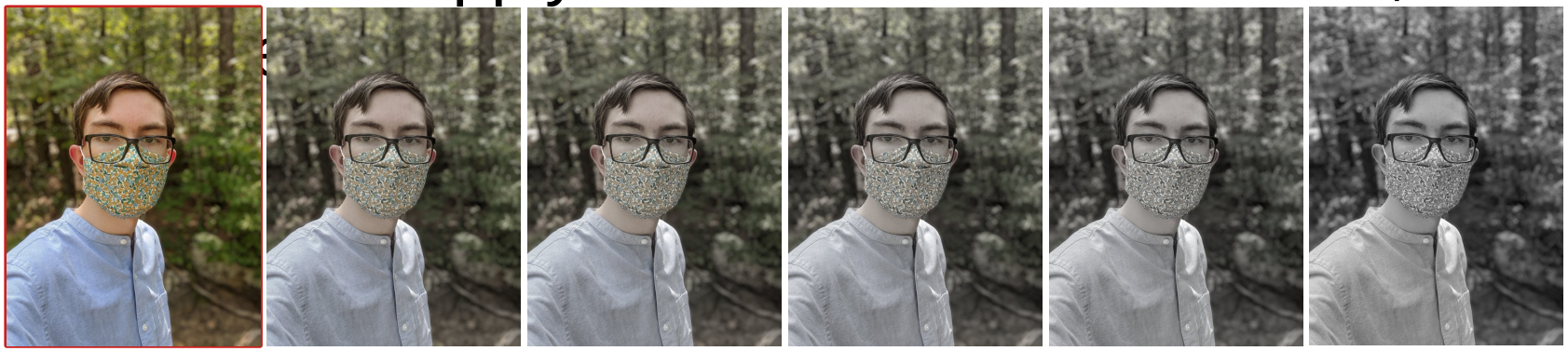


image1.png
Original

pic_2_3_6.png
Desat: 0.6

pic_2_3_7.png
Desat: 0.7

pic_2_3_8.png
Desat: 0.8

pic_2_3_9.png
Desat: 0.9

pic_2_3_10.png
Desat: 1.0

Desaturate / {Pic_2_3_n} / [code]

```
1.  def desaturate(img ,percent):
2.      desat = 1*np.double(img[:, :, :])
3.      greyImg = greyscale(img)


4.      # Actual math behind desat
5.      desat[:, :, :] = (desat[:, :, :] *(1 - percent)) + (greyImg[:,:,None] * percent)
6.      # Overflow Check
7.      desat[desat > 255] = 255
8.      desat[desat < 0] = 0


9.      return desat
```

Contrast / {Pic_2_4_n}

- *Task:* Apply the contrast filter 0.5 to 1.5, 0.1

image1.png
Original

pic_2_4_0.png
Factor: 0.5

pic_2_4_1.png
Factor: 0.6

pic_2_4_2.png
Factor: 0.7

pic_2_4_3.png
Factor: 0.8

pic_2_4_4.png
Factor: 0.9

pic_2_4_5.png
Factor: 1.0

Contrast / {Pic_2_4_n} / Cont.

- *Task:* Apply the contrast filter 0.5 to 1.5, 0.1

image1.png
Original

pic_2_4_6.png
Factor: 1.1

pic_2_4_7.png
Factor: 1.2

pic_2_4_8.png
Factor: 1.3

pic_2_4_9.png
Factor: 1.4

pic_2_4_10.png
Factor: 1.5

Contrast / {Pic_2_4_n} / [code]

```
1.  def contrast(img, factor):
2.      cimg = 1*img
3.      b = cimg[:, :, 0]
4.      g = cimg[:, :, 1]
5.      r = cimg[:, :, 2]
6.      b = (b-128.0) * factor+128
7.      b[b > 255] = 255
8.      b[b < 0] = 0
9.      g = (g-128.0) * factor+128
10.     g[g > 255] = 255
11.     g[g < 0] = 0
12.     r = (r-128.0) * factor+128
13.     r[r > 255] = 255
14.     r[r < 0] = 0
15.     cimg[:, :, 0] = b
16.     cimg[:, :, 1] = g
17.     cimg[:, :, 2] = r
18.     return cimg
```

Tint / {Pic_2_5_n}

- *Task:* Create three tinted photos.

image1.png
original

pic_2_5_0.png
50% Blue

pic_2_5_1.png
70% Green

pic_2_5_2.png
40% Red

Tint / {Pic_2_5_n} / [code]

```
def tint(img, color, percent):
    timg=img[:,:,:]
    tint=127


    # Assigning bgr values
    b=timg[:, :, 0]
    g=timg[:, :, 1]
    r=timg[:, :, 2]
```

```
# Applying tints based on color input & percent.
if color=="blue":
    b = 1.0*b+(255-b)*percent

if color=="green":
    g = 1.0 * g + (255 - g) * percent

if color=="red":
    r = 1.0 * r + (255 - r) * percent

# Reassigning gbr values
timg[:, :, 0] = b
timg[:, :, 1] = g
timg[:, :, 2] = r

return timg
```