HW11

2016024766 | 김서현

Input Image









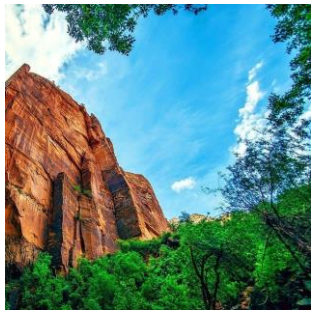

Correlation coefficients 계산 방법

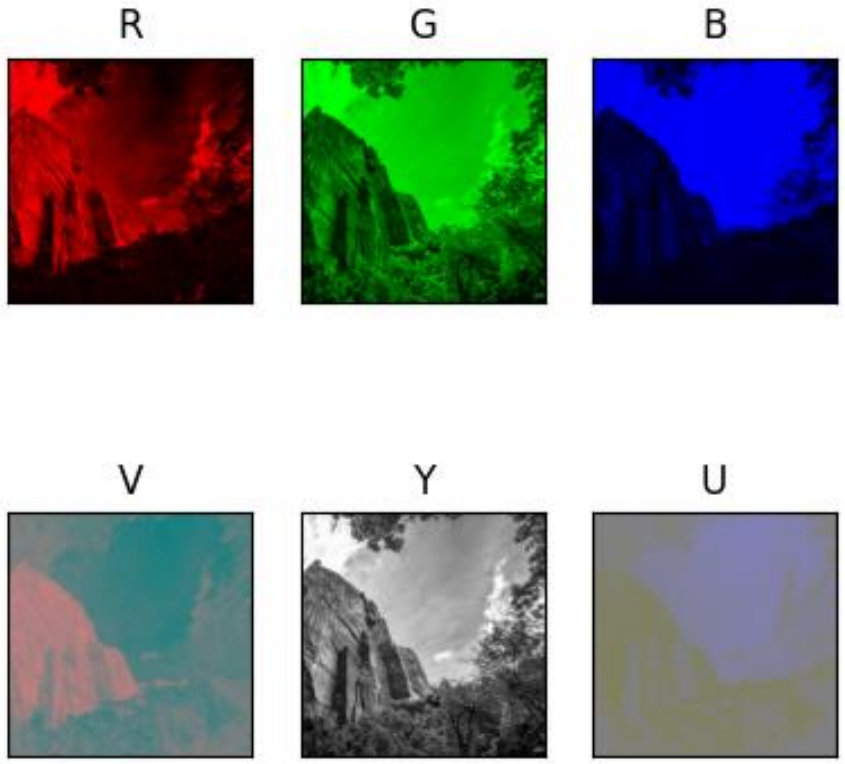
- 우선 이미지파일을 열어서 r, g, v 벡터를 각각 분리했습니다.
- r-g, g-b, b-r에 대한 correlation coefficients를 구하기 위해 공분산과 표준편차를 계산했습니다.
  - numpy의 np.cov()함수를 이용해서 공분산과 표준편차를 계산했습니다.
- 아래의 식을 이용해서 correlation coefficients를 계산했습니다.

$$\rho_{X,Y} = \frac{cov(X,Y)}{\sigma_X \sigma_Y} = \frac{E[(X-\mu_X)(Y-\mu_Y)]}{\sigma_X \sigma_Y}$$

- YUV 변환을 한 뒤에도 동일한 방법으로 correlation coefficients를 계산했습니다.
  - YUV 변환을 위해 cv2.cvtColor() 함수를 이용하였습니다.

계산 결과 #1



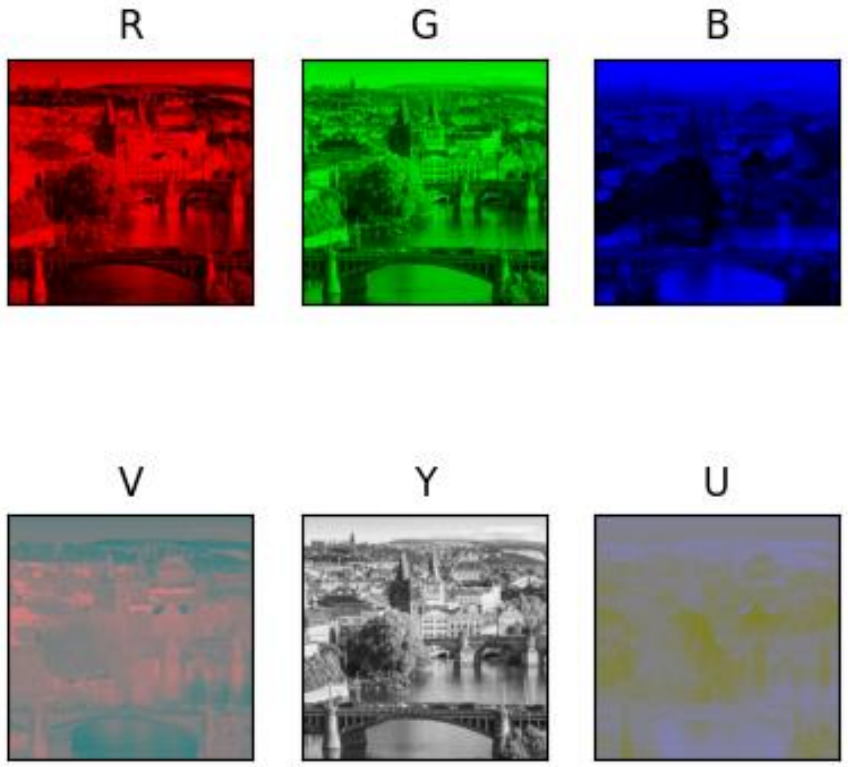


<Correlation coefficients>

RG: 0.551770
GB: 0.906739
BR: 0.393634

VY: -0.249112
YU: 0.390421
UV: -0.781614

계산 결과 #2

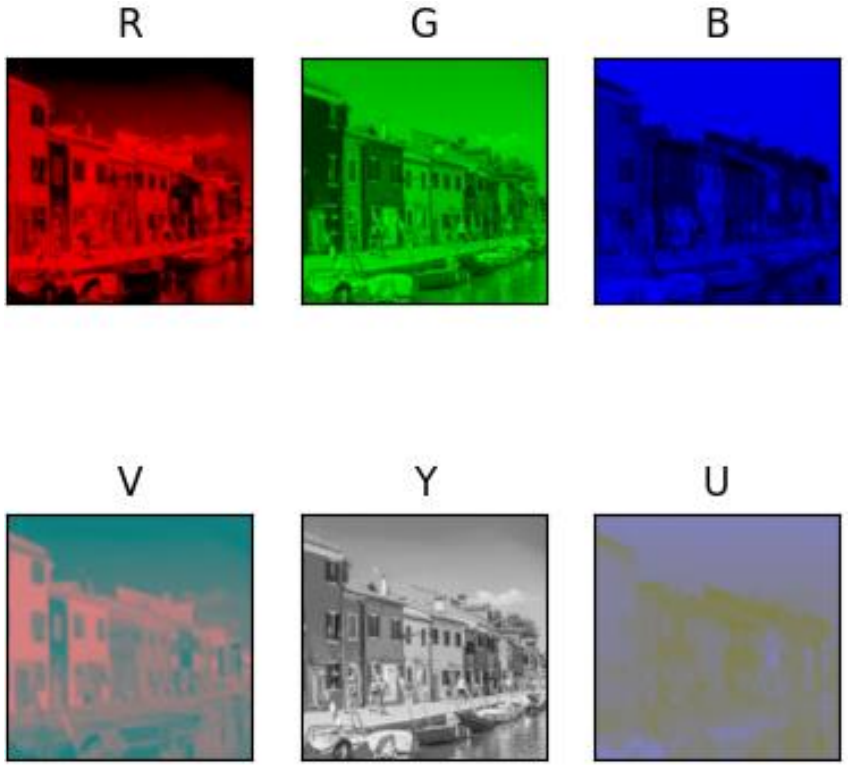


<Correlation coefficients>

RG: 0.806757
GB: 0.702994
BR: 0.312628

VY: 0.097175
YU: -0.151224
UV: -0.819586

계산 결과 #3

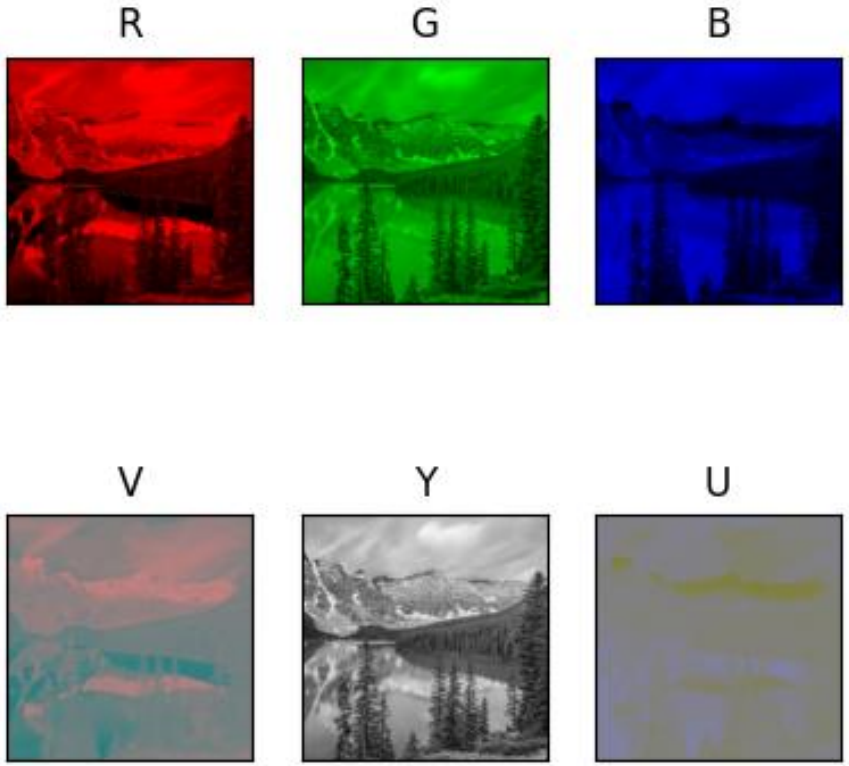


<Correlation coefficients>

RG: 0.035112
GB: 0.668365
BR: -0.278442

VY: -0.003110
YU: -0.151875
UV: -0.737620

계산 결과 #4

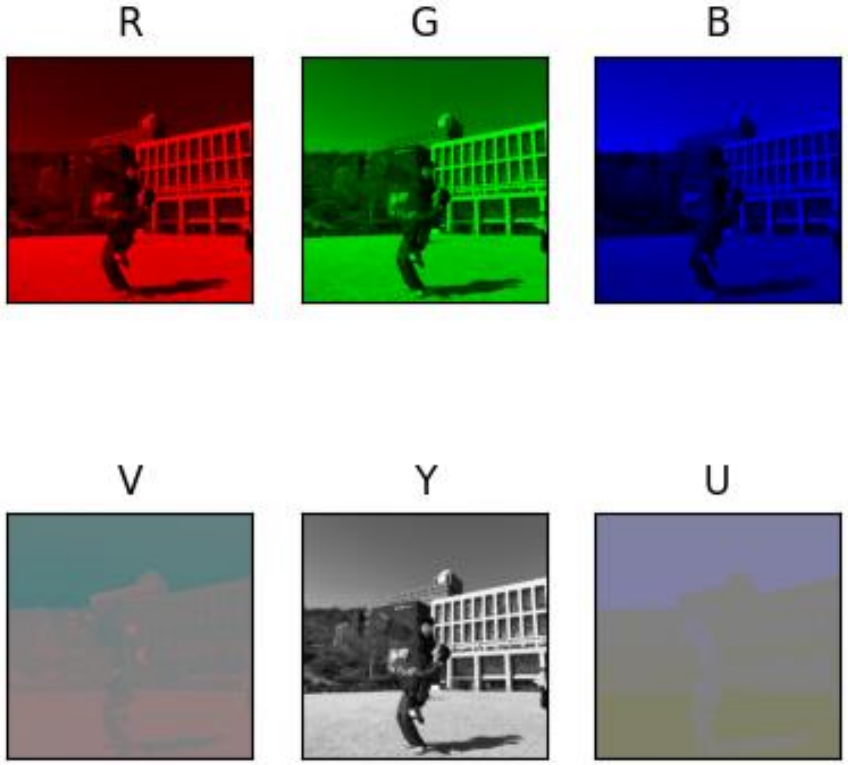


<Correlation coefficients>

RG: 0.816607
GB: 0.868389
BR: 0.599503

VY: 0.520054
YU: -0.085883
UV: -0.708146

계산 결과 #5

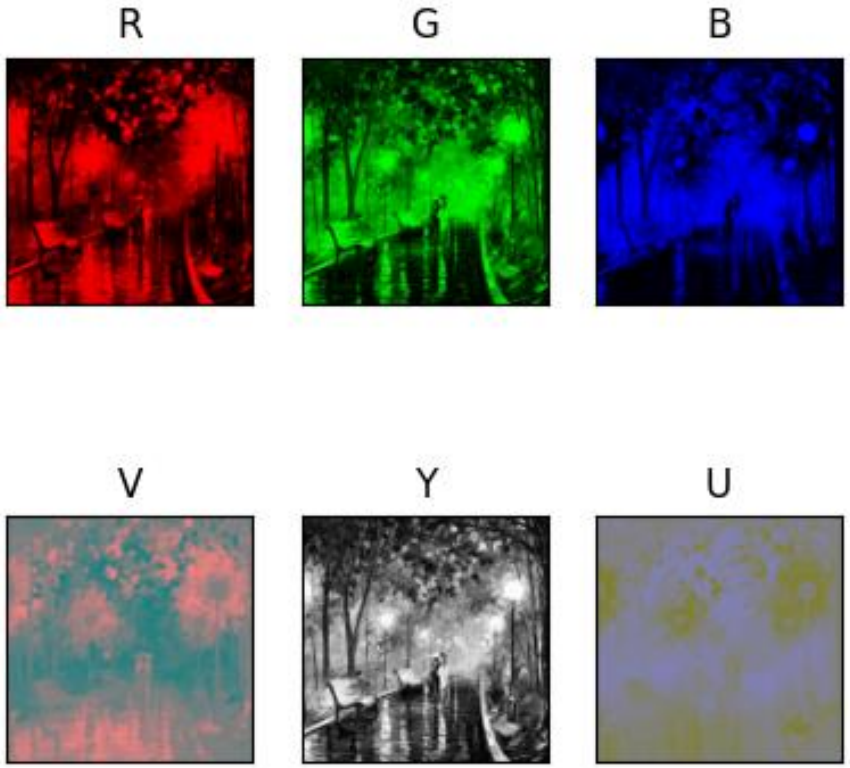


<Correlation coefficients>

RG: 0.931254
GB: 0.771869
BR: 0.496671

VY: 0.357574
YU: -0.396317
UV: -0.984083

계산 결과 #6

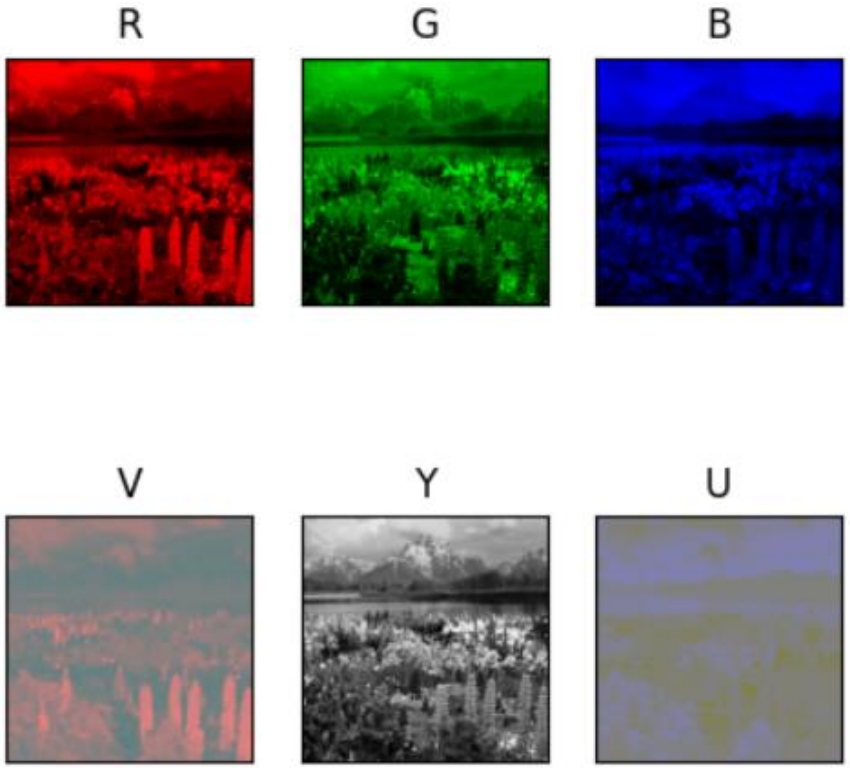


<Correlation coefficients>

RG: 0.547071
GB: 0.747357
BR: 0.060163

VY: -0.111467
YU: -0.167165
UV: -0.794979

계산 결과 #7

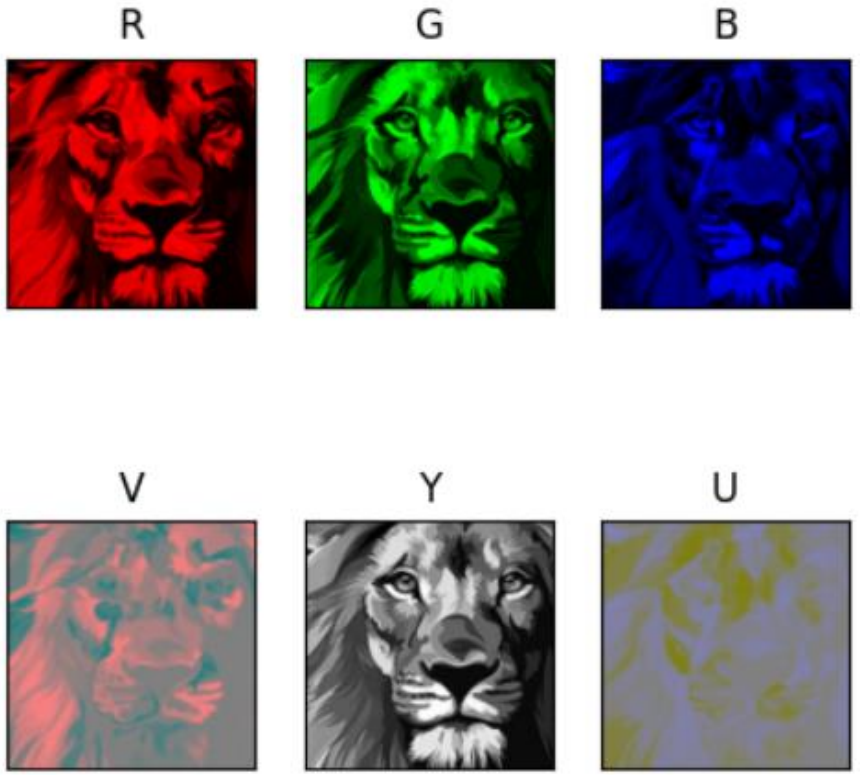


<Correlation coefficients>

RG: 0.731305
GB: 0.729957
BR: 0.678692

VY: 0.114426
YU: 0.082356
UV: -0.170511

계산 결과 #8

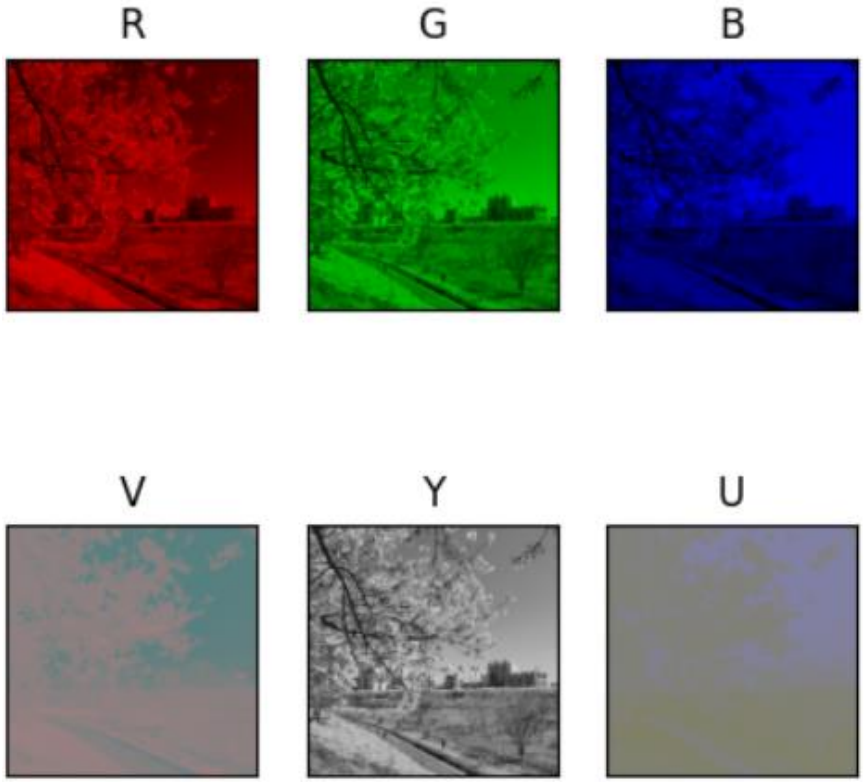


<Correlation coefficients>

RG: 0.598916
GB: 0.360780
BR: 0.150208

VY: 0.049310
YU: -0.544173
UV: -0.315623

계산 결과 #9

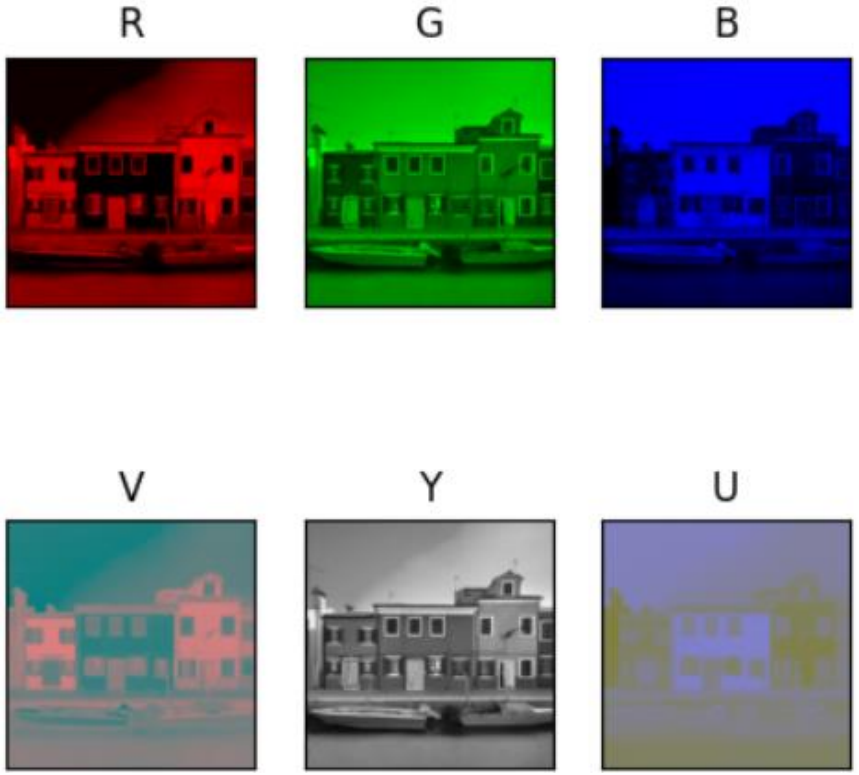


<Correlation coefficients>

RG: 0.849969
GB: 0.854575
BR: 0.493817

VY: -0.132579
YU: 0.103324
UV: -0.939766

계산 결과 #10



<Correlation coefficients>

RG: 0.277312
GB: 0.763107
BR: -0.233549

VY: -0.114394
YU: 0.078241
UV: -0.899714

결과 분석

- Correlation coefficients는 모두 -1과 1 사이의 값으로 나왔습니다.
- 대부분의 결과에서 RGB에서의 correlation coefficient가 YUV에서의 Correlation coefficient보다 절댓값이 크게 나타났습니다.