ColorPaletteExtractionAnalysis

June 17, 2021

1 K Means Clustering
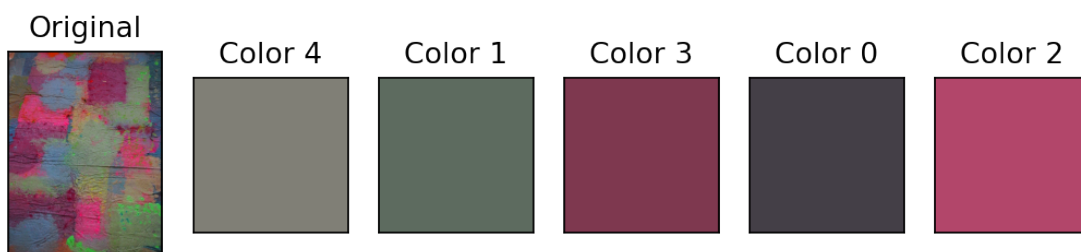
```python
[26]: import numpy as np
      import cv2 as cv
      from matplotlib import pyplot as plt
      from matplotlib.pyplot import figure
      from collections import Counter
      import os
      from sklearn.cluster import KMeans

      folder = 'sample'
      for filename in os.listdir(folder):
          figure(figsize=(8, 6), dpi=160)
          img_original = cv.imread(folder+'/'+filename)
          img_original = cv.cvtColor(img_original, cv.COLOR_BGR2RGB)
          pixels = np.reshape(img_original,(-1,3))
          clustering = KMeans(init="k-means++",n_clusters=5).fit(pixels)
          labels_unique = np.unique(clustering.labels_)
          counter = Counter(clustering.labels_)
          print('Count of Labels = ',counter.most_common())
          plt.subplot(1,len(clustering.cluster_centers_)+1,1),plt.imshow(img_original)
          plt.title('Original'), plt.xticks([]), plt.yticks([])
          for i in range(len(counter.most_common())):
              color_i = [[clustering.cluster_centers_[counter.most_common()[i][0]]/
      ↪255]*400]*400
              plt.subplot(1,len(clustering.cluster_centers_)+1,i+2),plt.
      ↪imshow(color_i)
              plt.title('Color '+str(counter.most_common()[i][0])), plt.xticks([]),␣
      ↪plt.yticks([])
          plt.show()
```
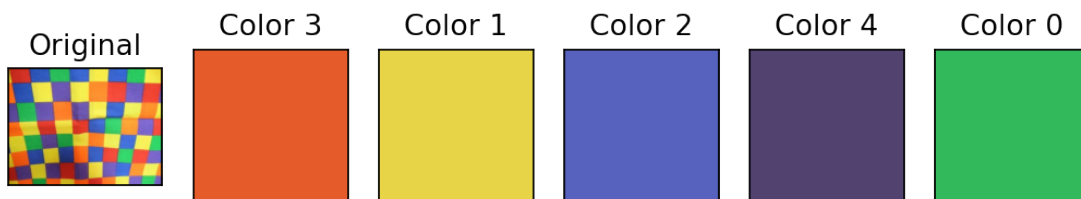
```
Count of Labels =  [(3, 94570), (1, 55249), (0, 54350), (2, 34844), (4, 23131)]
```
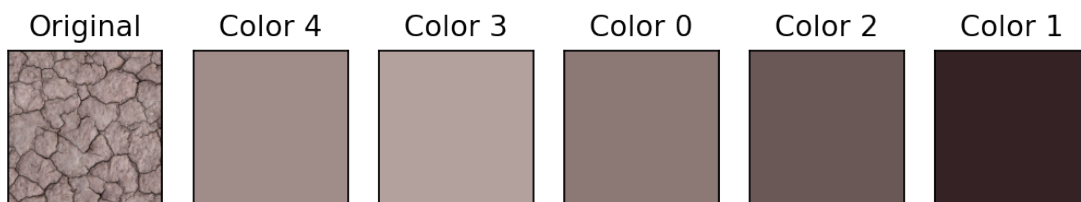
Original	Color 3	Color 1	Color 0	Color 2	Color 4

Count of Labels = [(4, 88683), (1, 76710), (3, 63625), (0, 42566), (2, 35616)]

Original	Color 4	Color 1	Color 3	Color 0	Color 2

Count of Labels = [(3, 32553), (1, 31329), (2, 26820), (4, 14968), (0, 14330)]

Original	Color 3	Color 1	Color 2	Color 4	Color 0

Count of Labels = [(4, 153505), (3, 101594), (0, 95987), (2, 40596), (1, 17918)]

Original	Color 4	Color 3	Color 0	Color 2	Color 1

Count of Labels = [(4, 62872), (0, 54493), (2, 51994), (3, 34763), (1, 22378)]

Original	Color 4	Color 0	Color 2	Color 3	Color 1
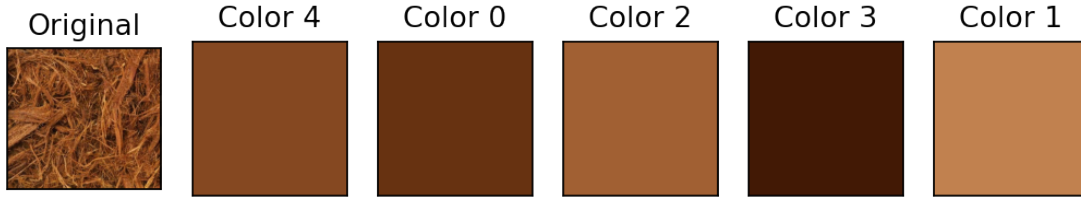
Count of Labels = [(1, 72153), (3, 71765), (0, 40103), (2, 19745), (4, 17337)]

Original	Color 1	Color 3	Color 0	Color 2	Color 4
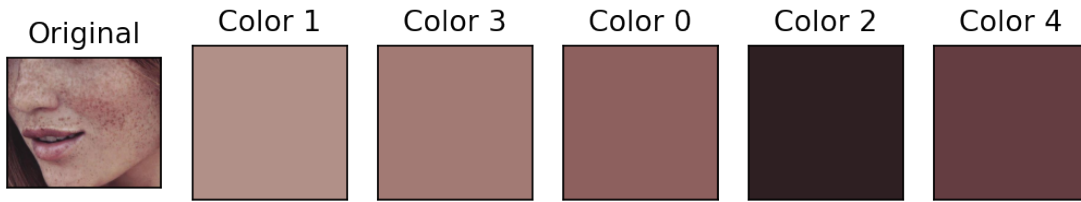
Count of Labels = [(0, 55324), (3, 53363), (4, 50589), (2, 30719), (1, 29815)]

Original	Color 0	Color 3	Color 4	Color 2	Color 1
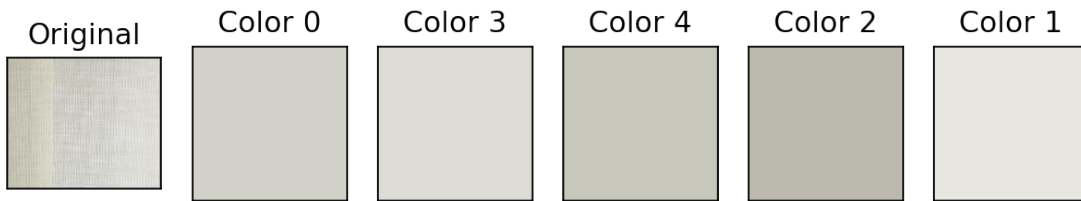
Count of Labels = [(2, 54088), (0, 17491), (4, 12835), (1, 8624), (3, 3058)]

Original	Color 2	Color 0	Color 4	Color 1	Color 3
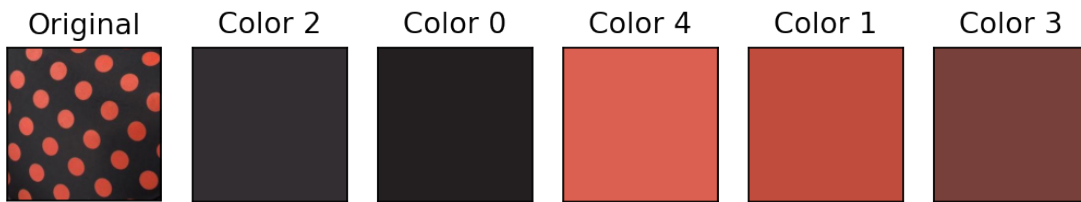
Count of Labels = [(0, 105207), (2, 69627), (1, 47030), (4, 26077), (3, 22995)]

Original   Color 0   Color 2   Color 1   Color 4   Color 3
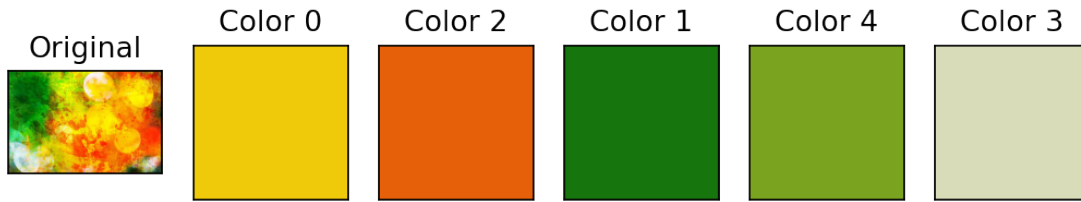
Count of Labels = [(2, 53404), (0, 46697), (4, 31173), (1, 24207), (3, 19243)]

Original   Color 2   Color 0   Color 4   Color 1   Color 3
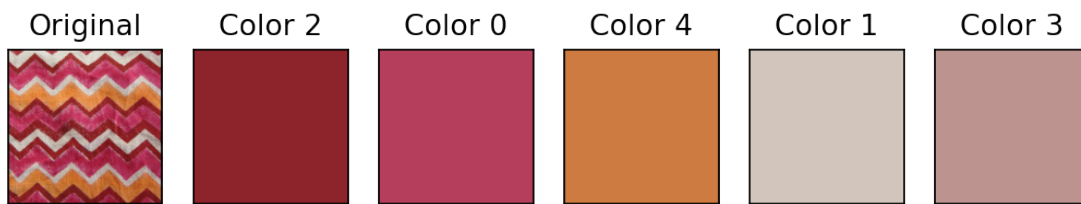
2   Mean Shift Clustering

```
[27]: import numpy as np
      import cv2 as cv
      from matplotlib import pyplot as plt
      from matplotlib.pyplot import figure
      from collections import Counter
      import os
      from sklearn.cluster import MeanShift, estimate_bandwidth
      import torch

      folder = 'sample'
      for filename in os.listdir(folder):
          figure(figsize=(8, 6), dpi=160)
          img_original = cv.imread(folder+'/'+filename)
          img_original = cv.cvtColor(img_original, cv.COLOR_BGR2RGB)
          img_original = cv.resize(img_original,(64,64))
          pixels = np.reshape(img_original,(-1,3))
          bandwidth = estimate_bandwidth(pixels, quantile=0.2)
          clustering = MeanShift(bandwidth=bandwidth).fit(pixels)
          labels_unique = np.unique(clustering.labels_)
          counter = Counter(clustering.labels_)
          print('Count of Labels = ',counter.most_common())
          plt.subplot(1,len(clustering.cluster_centers_)+1,1),plt.imshow(img_original)
          plt.title('Original'), plt.xticks([]), plt.yticks([])
```
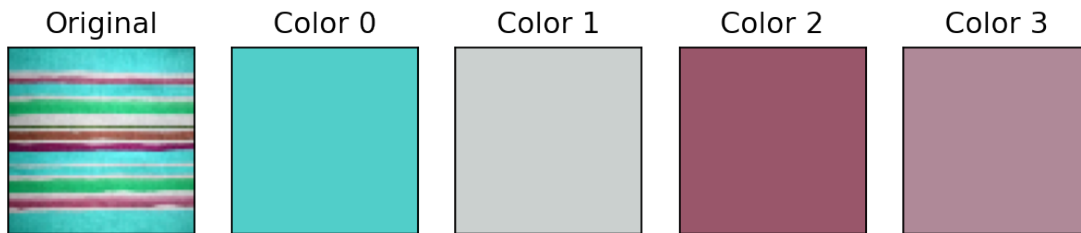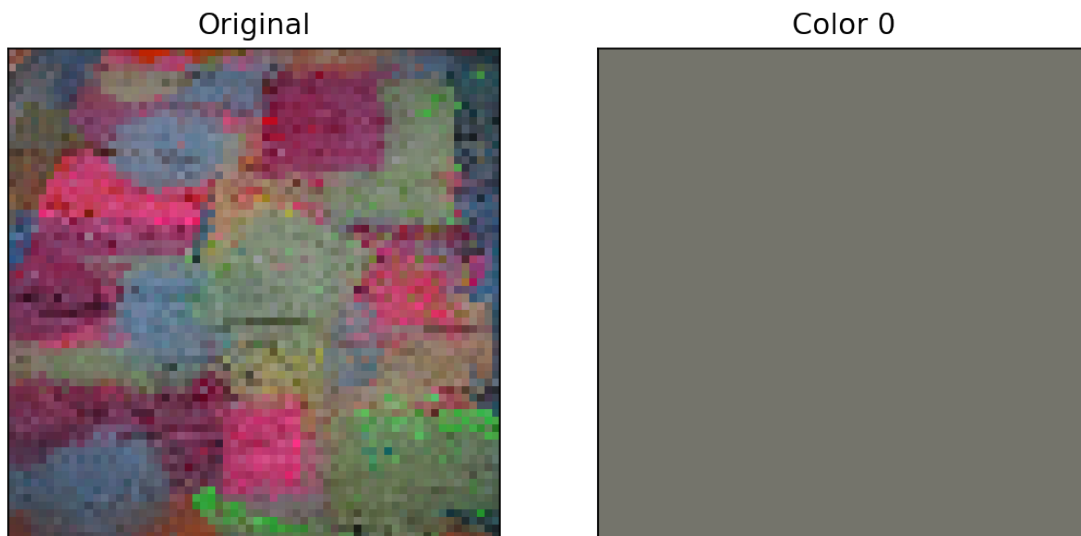
```
    for i in range(len(counter.most_common())):
        color_i = [[clustering.cluster_centers_[counter.most_common()[i][0]]/
↪255]*400]*400
        plt.subplot(1,len(clustering.cluster_centers_)+1,i+2),plt.
↪imshow(color_i)
        plt.title('Color '+str(counter.most_common()[i][0])), plt.xticks([]),␣
↪plt.yticks([])
    plt.show()
```
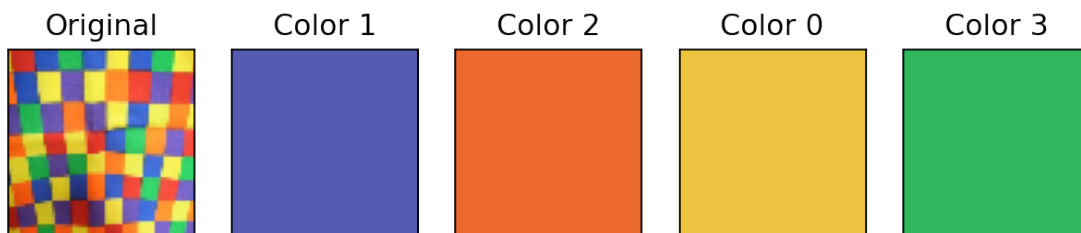
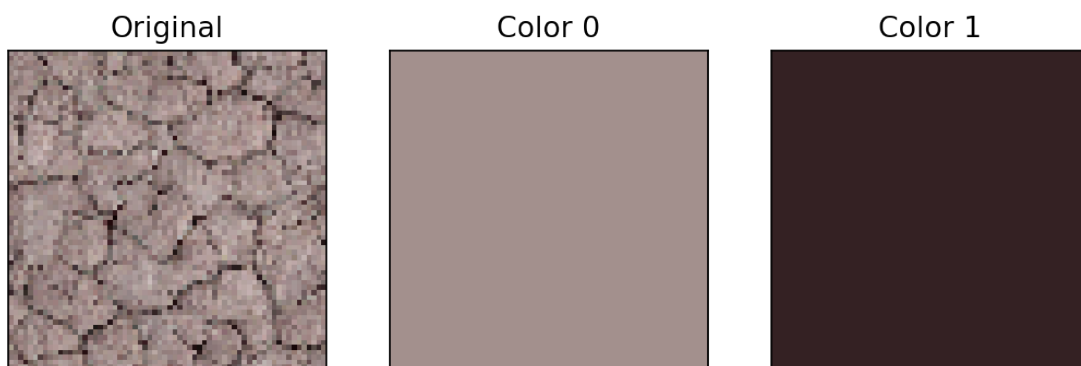Count of Labels = [(0, 2321), (1, 838), (2, 643), (3, 294)]

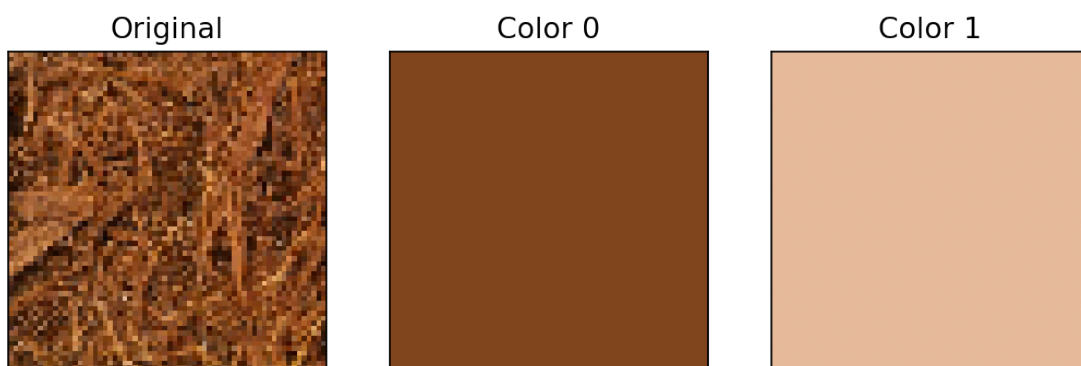
Count of Labels = [(0, 4096)]

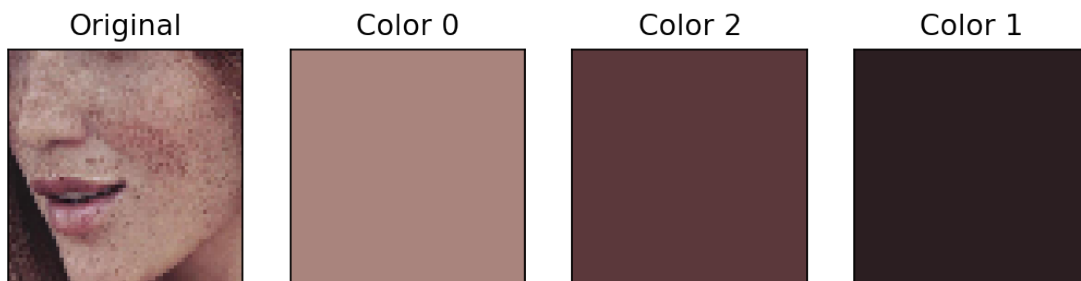Count of Labels = [(1, 1369), (2, 1115), (0, 1090), (3, 522)]

Original	Color 1	Color 2	Color 0	Color 3

Count of Labels = [(0, 3755), (1, 341)]

Original	Color 0	Color 1

Count of Labels = [(0, 3971), (1, 125)]

Original	Color 0	Color 1

Count of Labels = [(0, 3195), (2, 575), (1, 326)]

Original	Color 0	Color 2	Color 1

Count of Labels = [(0, 2180), (1, 1916)]

Original	Color 0	Color 1
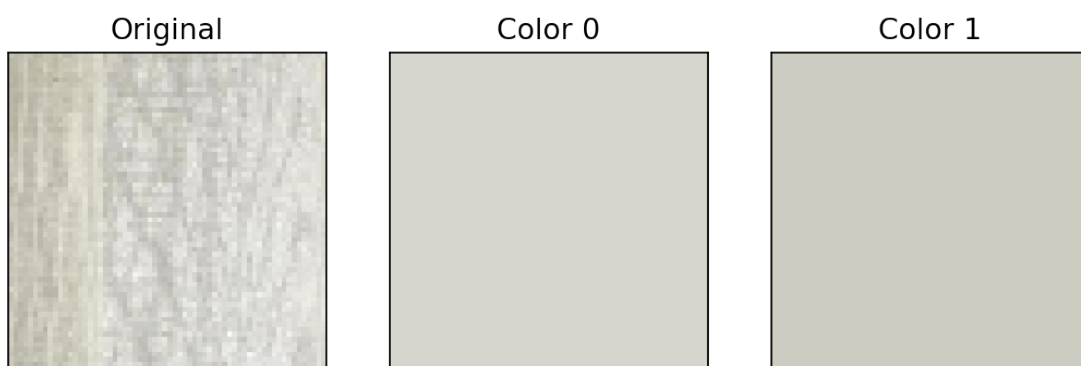
Count of Labels = [(0, 3097), (1, 780), (2, 218), (3, 1)]

Original	Color 0	Color 1	Color 2	Color 3

Count of Labels = [(0, 2780), (1, 884), (2, 311), (3, 121)]

Original	Color 0	Color 1	Color 2	Color 3
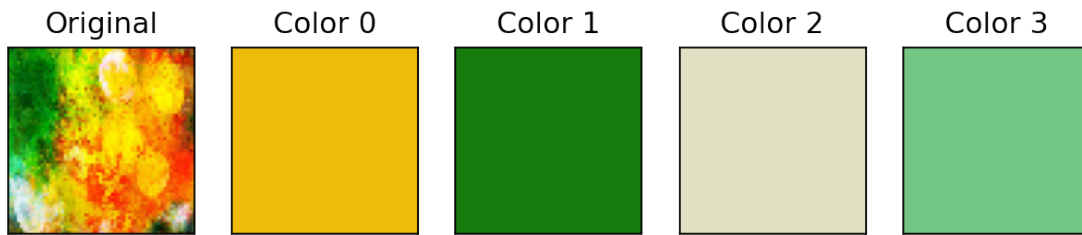
Count of Labels = [(0, 2074), (2, 1149), (1, 873)]

Original	Color 0	Color 2	Color 1