Pattern Recognition Methods
and
Introduction to Machine Learning

Homework 6 - Report
Discovering The Colour Palette

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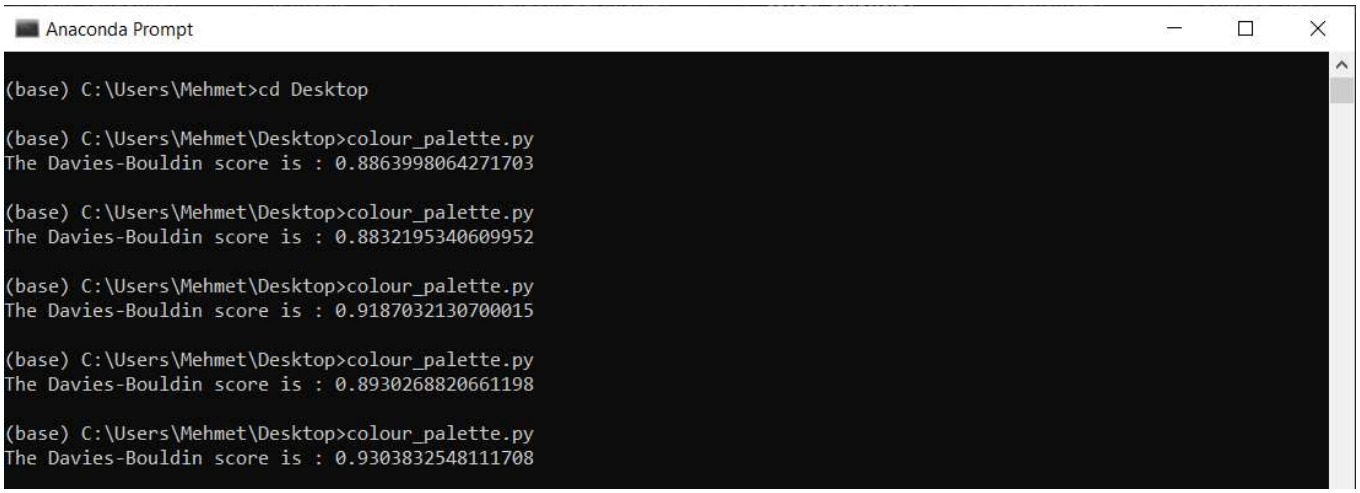
The chosen photo is shown below:

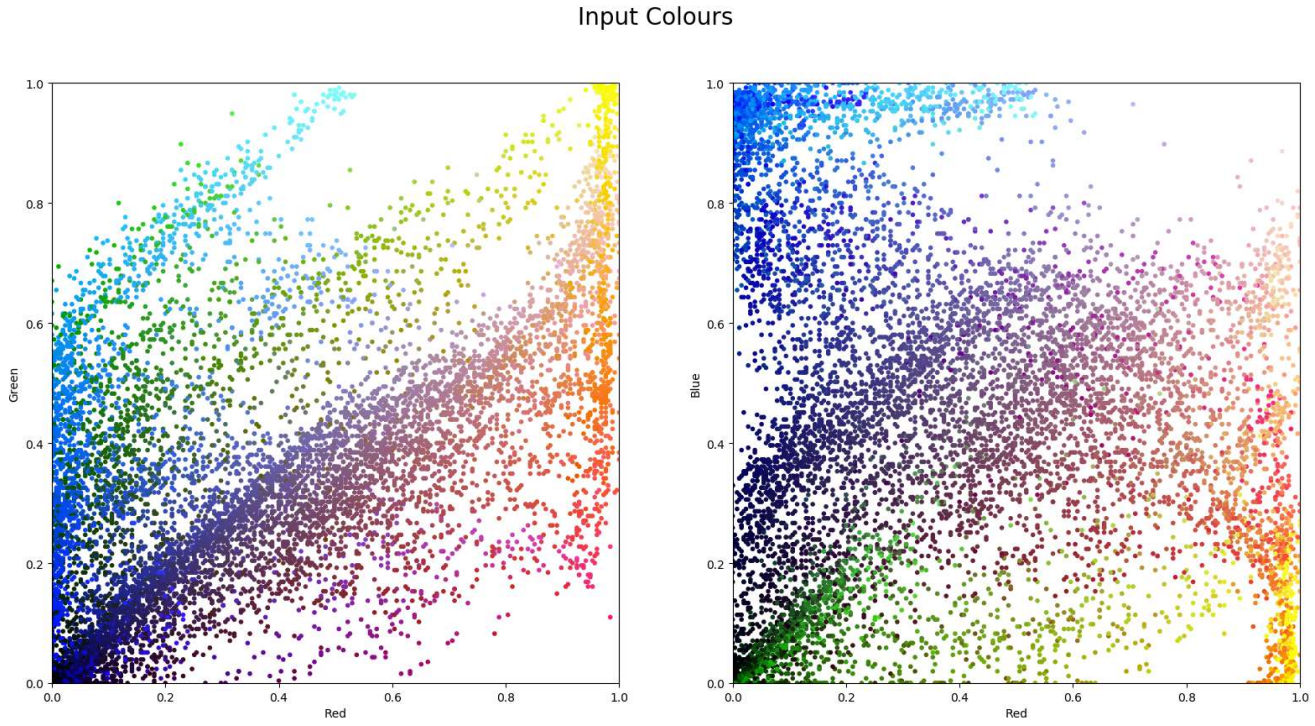
This photo's data shape is (360,640,3).

Applied code is run for 5 times and its results are shown below:

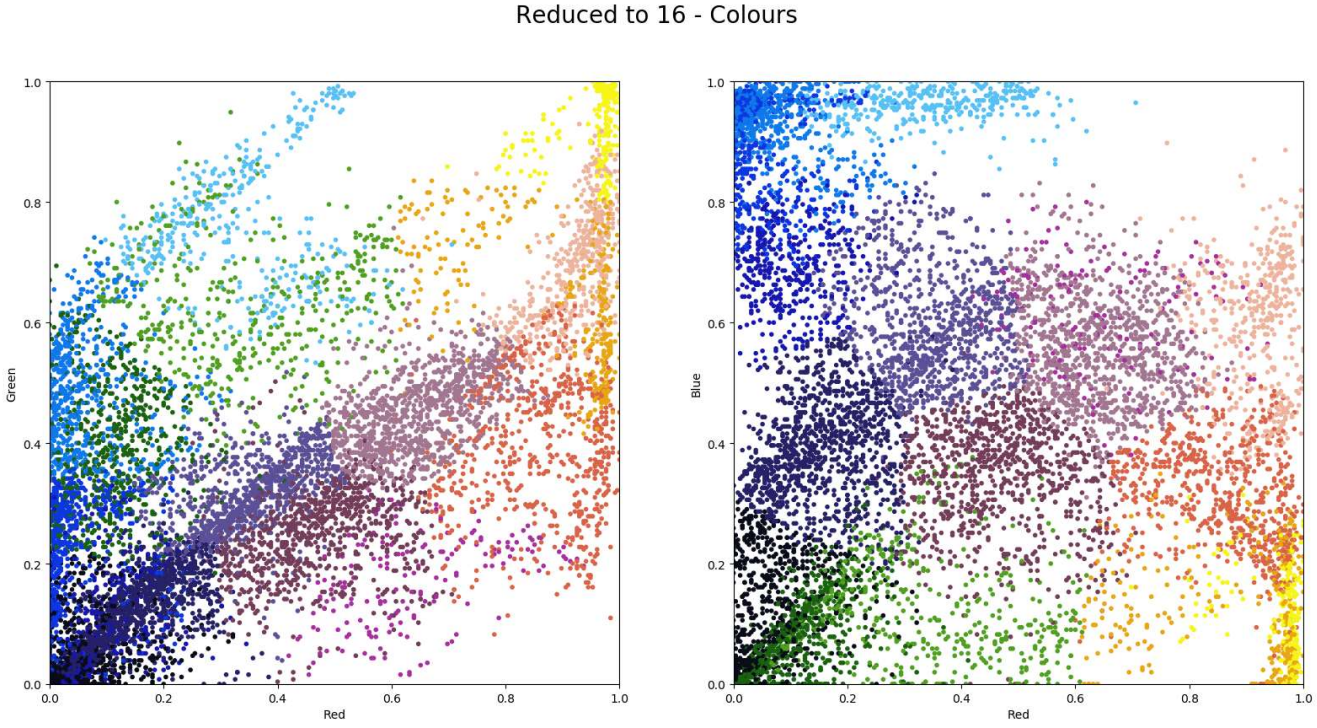


The average Davies-Bouldin score for these 5 runs is 0.902346.

Input image's initial colour palette is seen as this:

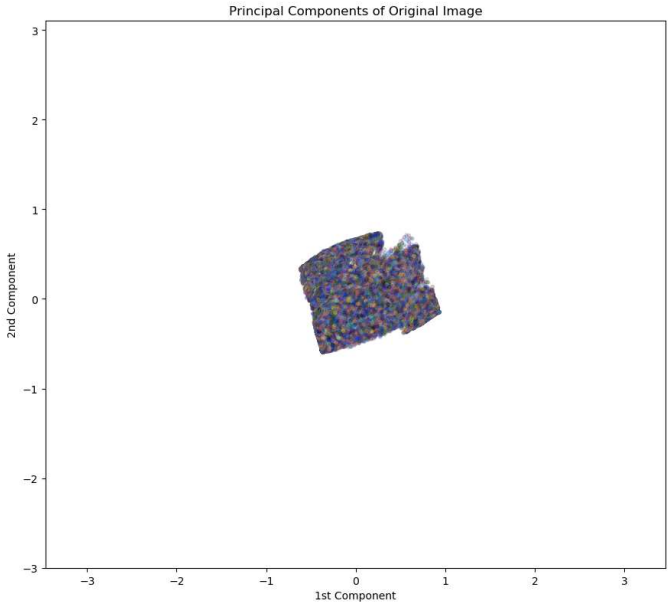


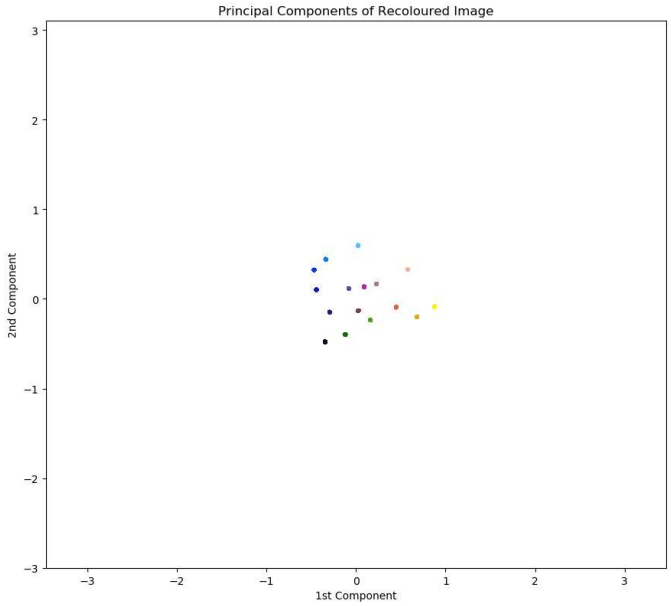
Since the dataset is huge, MiniBatchKMeans from sklearn is used to reduce colour numbers of input image. Mini batch k-means is much more faster than the standard k-means algorithm in a large dataset. After the use of mini batch k-means, colour palette becomes as this:



16 clusters are created by clustering the colours of the input image.

Following graphs is the result of applying principal component analysis (PCA) in order to original and recoloured images:





On the first graph there are thousands of colour pixels which belongs to the original image. As you can see on the second graph, there are just 16 pixels after applying k-means.

After all these procedures, final form of the image is shown below on the right:

As a conclusion, k-means algorithm can be used to compress the images. While doing this operation, image still remains understandable.