

Question Answered step-by-step

Use an image, dogs.jpeg and implement k-means clustering for image...

Use an image, dogs.jpeg and implement k-means clustering for image segmentation and identify dominant color in the image.

Objective:

•Use k-means clustering for image segmentation and to identify dominant color in the image.

Question:

1.Open and display the image "dog.jpeg". Convert the image in to numpy array, so that i can be used in further processing.

[Hint: Use PIL module from python]

2. Find out the dimensions of the image and convert it in to a two-dimensional array.

3.Use kmeans clustering with k set to 3 and cluster the image.

[Hint: Refer to k-means module of scikit learn]

4. Predict the cluster label of every pixel in the image and plot it back as an image.

5. Find out the three dominant color in the image.

[Hint: The cluster centers should correspond to three dominant colors]

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Dogs.jpeg- https://drive.google.com/file/d/1EQCS-FNEKtp4R9f6XNf_YJMgypazC84S/view?usp=sharing
Expert Tutor

Answer & Explanation Solved by verified expert

Here is the **python code** for the **above question**.

Follow comments for explanation. **Screenshot** of output showing **three dominant colors** is shown as a reference

(Use the following link to run the below code on an online python editor. Please upload the image in your drive directly without storing in any folder and run the code here->

<https://colab.research.google.com/drive/1nDVcGZIs5Tff5bQiAEzdmrSE1JoyLU-9?usp=sharing>)

Note: dogs.jpeg must be in the same folder that of the python code

The RGB values for three dominant colors(R,G,B) are :

(210, 174, 143) ,

(29, 21, 20),

(251, 247, 243)

Do comment if you have any issues

Step-by-step explanation

Python Code:



```

import numpy as np
im = Image.open("dogs.jpeg")
img = np.array(im)
# Question-2) Find out the dimensions of the image and convert it in to a two-dimensional array
# since dominant colors should be color centers we need to convert it in such a way,we don't loose information
on color
new_img = img.reshape((img.shape[0]*img.shape[1]), img.shape[2])
new_img = new_img
#3) Use kmeans clustering with k set to 3 and cluster the image
from sklearn.cluster import KMeans
# Fit k-means clustering using sklearn k-means algorithm
pixel_prediction_cluster = KMeans(n_clusters=3, random_state=0).fit(new_img)
#4) predict labels for each pixel and plot it back as image with corresponding label color
predicted_labels = np.zeros((img.shape[0],img.shape[1],3))
for i in range(img.shape[0]):
    for j in range(img.shape[1]):
        predicted_labels[i,j] =
pixel_prediction_cluster.cluster_centers_[pixel_prediction_cluster.predict(img[i,j].reshape(1,-1))]
PIL_image = Image.fromarray(predicted_labels.astype('uint8'), 'RGB')
PIL_image.show()
#5) print the three dominant colors
dominant_colors = pixel_prediction_cluster.cluster_centers_
print("The RGB values of three dominant colors is given by ")
for i in range(3):
    print(tuple(dominant_colors[i].astype(int)))

```

Screenshot of output:

The screenshot shows a Google Colaboratory notebook interface. The left sidebar displays the file explorer with folders for 'drive', 'sample_data', and 'dogs.jpeg'. The main workspace shows a code cell with the following Python code:

```

#5) print the three dominant colors
dominant_colors = pixel_prediction_cluster.cluster_centers_
print("The RGB values of three dominant colors is given by ")
for i in range(3):
    print(tuple(dominant_colors[i].astype(int)))

```

The output of the code cell is:

```

The RGB values of three dominant colors is given by
(210, 174, 143)
(29, 21, 20)
(251, 247, 243)

```

Below the code cell, there is a section titled "Image transcription text" which contains the following text:

```

co dog_PIL.ipynb - Colaboratory X python - Printing one
color using X G print color using PIL - Google Sec X + X A
colab.research.google.com/drive/1nDVcGZIs5... Show more

```

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