

```
import numpy as np
from PIL import Image
from sklearn.cluster import KMeans
import matplotlib.pyplot as plt

# Load the image
image = Image.open('sunflower.jpg')

# Convert the image to a numpy array
image_array = np.array(image)
# Reshape the image array to 2D
image_2d = image_array.reshape(-1, 3)

# Perform clustering for different k values
k_values = [2, 3, 5, 10, 15, 20]

for k in k_values:

    kmeans = KMeans(n_clusters=k, random_state=42)

    # Fit the K-means model to the image data
    kmeans.fit(image_2d)

    # Get the labels assigned to each pixel
    labels = kmeans.labels_

    # Create a compressed image using the cluster centers
    compressed_image = kmeans.cluster_centers_[labels]

    # Reshape the compressed image back to the original shape
    compressed_image = compressed_image.reshape(image_array.shape)

    # Plot the compressed image
    plt.figure(figsize=(6, 6))
    plt.imshow(compressed_image.astype(np.uint8))
    plt.title(f'K = {k} clusters')
    plt.axis('off')
    plt.show()
```



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usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: Th  
warnings.warn(
```

K = 2 clusters



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usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: Th  
warnings.warn(
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K = 3 clusters



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usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: Th  
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K = 5 clusters





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K = 10 clusters



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usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: Th  
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K = 15 clusters



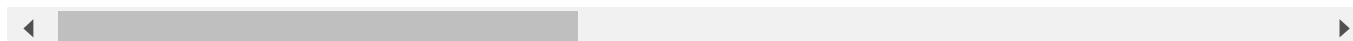
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usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: Th
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warnings.warn(
```

K = 20 clusters



```
#As we increase the number of clusters the image quality increases as we are  
# moving towards more precision with more number of clusters
```



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