Practical No – 6

Title – Implement a program for feature extraction in 2D color images (any features like color, texture etc. and to extract features from input image and plot histogram for the features. Give me code this problem statement

Program :

```
import cv2

print(cv2.__version__)


import numpy as np

import matplotlib.pyplot as plt

from skimage.feature import graycomatrix, graycoprops


image_path = 'a.jpg'  # Specify your image path

image = cv2.imread(image_path)

image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)  # Convert to RGB for plotting


def plot_color_histogram(image_rgb):

    colors = ('r', 'g', 'b')

    for i, color in enumerate(colors):

        hist = cv2.calcHist([image_rgb], [i], None, [256], [0, 256])

        plt.plot(hist, color=color)

        plt.xlim([0, 256])

    plt.title('Color Histogram (RGB)')

    plt.xlabel('Pixel Intensity')

    plt.ylabel('Frequency')

    plt.show(


def extract_texture_features(gray_image):

    glcm = graycomatrix(gray_image, distances=[1], angles=[0], levels=256, symmetric=True,
normed=True)
```

```
    contrast = graycoprops(glcm, 'contrast')[0, 0]
    dissimilarity = graycoprops(glcm, 'dissimilarity')[0, 0]
    homogeneity = graycoprops(glcm, 'homogeneity')[0, 0]
    energy = graycoprops(glcm, 'energy')[0, 0]
    correlation = graycoprops(glcm, 'correlation')[0, 0]

    texture_features = {
        'Contrast': contrast,
        'Dissimilarity': dissimilarity,
        'Homogeneity': homogeneity,
        'Energy': energy,
        'Correlation': correlation
    }
    return texture_features

gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)



plot_color_histogram(image_rgb)

texture_features = extract_texture_features(gray_image)
print("Texture Features (GLCM):")
for feature, value in texture_features.items():
    print(f'{feature}: {value}')

plt.imshow(gray_image, cmap='gray')
plt.title('Grayscale Image for Texture Analysis')
plt.show()
```

OUTPUT :

Figure 1 :

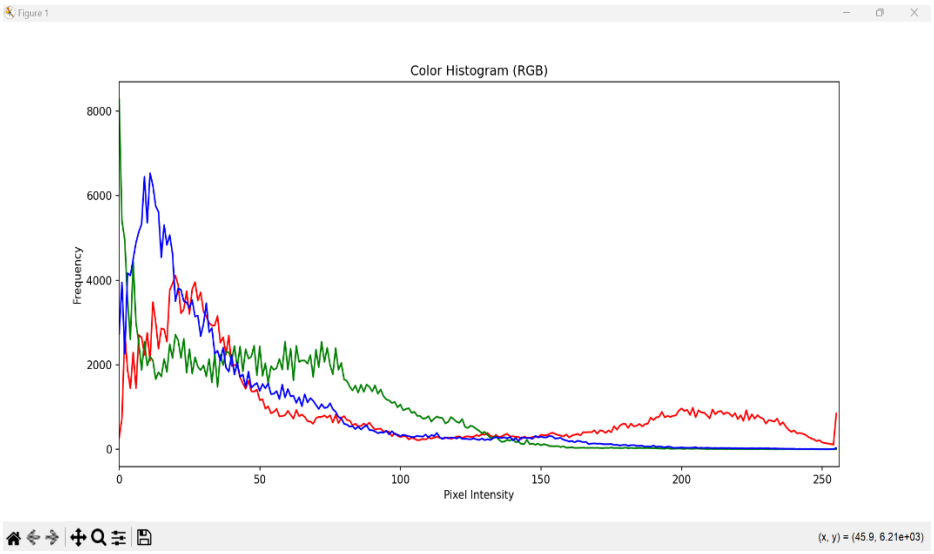
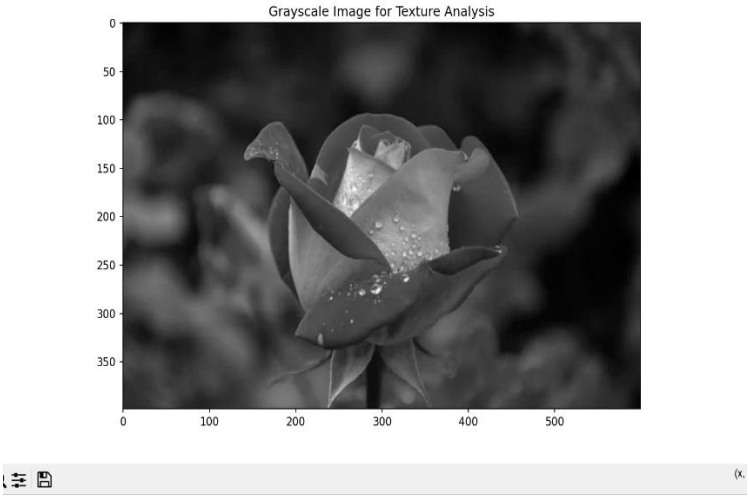


Figure 2 :




```
PS C:\Users\Vaishnavi\Desktop\isr labs\ISR6> python isr.py
4.10.0
Texture Features (GLCM):
Contrast: 24.635574746549175
Dissimilarity: 1.8845486002150613
Homogeneity: 0.5999656627660838
Energy: 0.05039741866276653
Correlation: 0.9903615660191045
PS C:\Users\Vaishnavi\Desktop\isr labs\ISR6>
```