Experiment No: 8

Image Processing using Python Libraries

Objective:

To develop a Python program that performs various image processing operations including loading, displaying, manipulating images, and analyzing image histograms.

Task Description:

You are tasked with developing a comprehensive Python program that reads and manipulates image data. The goal is to create a tool that processes images, allowing users to perform various operations on the data. This exercise aims to test your proficiency in handling different data formats and applying appropriate algorithms for manipulation.

1. **Image Loading and Display:** Your program should allow users to load an image file and display it. Ensure you use an image processing library like Pillow (PIL) to handle image data.
2. **Image Manipulation:** Implement at least two image manipulation operations, such as:
   - Applying filters (e.g., Gaussian blur, edge detection).
   - Changing image dimensions or cropping.
   - Adjusting brightness, contrast, or saturation.
   - Converting to grayscale or other color spaces.

Histogram Analysis: Implement a feature that calculates and displays histograms for different color channels of the loaded image. Allow users to analyze and manipulate histogram data.