Image Enhancement with Histogram

Project Overview:

The Image Enhancement with Histogram project aims to improve the quality of low-resolution images by applying various enhancement techniques.

The focus of the project is on improving image clarity, contrast, and denoising using Histogram Equalization, CLAHE, Gamma Correction, and other advanced methods.

The dataset used in the project contains low and high-quality images, and the comparison between them is used to evaluate the enhancement process.

Motive:

The goal is to enhance images for better visual interpretation in areas like medical imaging, satellite image processing, and other fields requiring high-quality visuals from low-resolution sources.

Libraries Used:

- OpenCV (cv2): For image loading, enhancement, and processing (CLAHE, denoising, etc.)

- NumPy: For array manipulations and mathematical operations

- Matplotlib: For plotting and visualizing images and histograms

- skimage: For Structural Similarity Index (SSIM) evaluation

- datetime: For timestamping log entries

- CSV: For logging metrics such as SSIM score into CSV format

Dataset Used:

The dataset used in this project consists of low-quality and high-quality images.

The low-quality images are enhanced and compared with the high-quality (ground truth) images for performance evaluation.

The images were sourced from a custom dataset with labeled low-resolution and high-resolution pairs.

Example:

- Low-quality images: Images with noise, low contrast, and blurring.

- High-quality images: Ground truth images that represent the ideal, clear version of each low-qualityimage.