Image Editor with Filters & Restoration (Python Project)

Project Overview

This Python-based project is a manual image editor and restoration tool that applies various image processing techniques. It supports color operations, point operations, histogram-based modifications, and neighborhood filters including average, median, Gaussian, and outlier removal. All techniques are implemented manually to provide deeper understanding of core image processing concepts.

Tools & Technologies

- Python 3
- NumPy
- OpenCV (used for image reading only)
- Matplotlib (for image display)
- Tkinter (optional GUI)

Features & Filters

- Point Operations: Brightness and contrast adjustment
- Color Operations: RGB separation, inversion, grayscale
- Histogram Operations: Manual histogram equalization
- Neighborhood Filters:
  - Average filter
  - Median filter
  - Gaussian blur
  - Outlier removal
- Rank-order filter (custom sorting-based kernel)
- Noise simulation and manual removal

✓ Applications

- Academic learning of image processing principles
- Preprocessing pipeline for computer vision tasks
- Foundation for full-scale image editing tools

Files Included

- image_editor.py — Core script
- sample_images/ — Input and result samples

How to Run

1. Place image in project folder.
2. Run: python image_editor.py
3. Choose the desired operation (filter, color edit, etc.)
4. Output image will be saved in the same folder.

Developed by:

Youssef Atef
AI Student – Menoufia University
GitHub: https://github.com/youssef442006
LinkedIn: https://www.linkedin.com/in/youssef-atef-810049313

Notes

- All filters are manually implemented for learning.
- Can be extended into a GUI-based image processing app.
- Useful for AI students and beginners in computer vision.