Homework: 07
Histogram Equalization: Custom Implementation vs OpenCV Built-in

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1 Introduction

Histogram equalization is a technique that enhances image contrast by redistributing intensity values more evenly. In this report, we implemented the method from scratch and compared it with OpenCV's built-in `equalizeHist()` function.

2 Method

- Convert the image to 1D.
- Compute histogram and cumulative distribution function (CDF).
- Normalize using the first non-zero CDF value.
- Apply the mapping table to create the equalized image.

The built-in OpenCV function follows the same idea but is optimized for performance.

3 Results

- **Original**: Low contrast image.
- **Custom Equalization**: Enhanced contrast with more uniform intensity distribution.

- **Built-in Equalization**: Nearly identical results to the custom method.

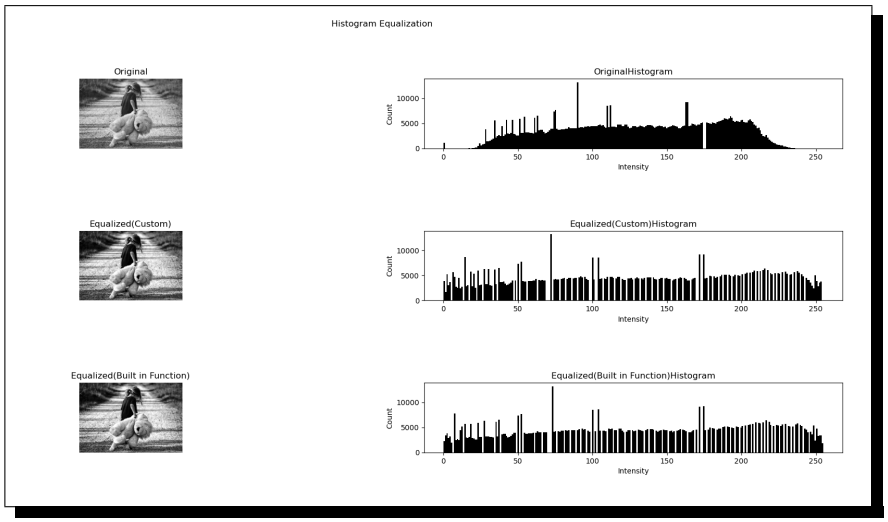

Figure 1: Comparison of Original, Custom Equalized, and Built-in Equalized Images

4 Conclusion

Both methods produce similar results. The custom function is useful for learning the algorithm, while the built-in OpenCV function is faster and suitable for practical applications.

5 Code Link

GitHub Repository