ECE1512 FALL 2025

ECE1512 – Assignment

- **Assigned: Wednesday, September 10, 2025; 5:00 pm**
- **Due: Wednesday, October 1, 2025; 5:00 pm (strict deadline) via Q**
- **Weight: 10 points (10% of the overall course grade)**
- **Late submission penalty: 2 points per hour**
- **Excessive plagiarism penalty: 5 points**

Part A: Image Enhancement Using Intensity Transformations

This project focuses on experimenting with intensity transformations to enhance an image.

Download Fig. 3.8(a) from the book (GW) website and improve it using

(1) The log transformation of Eq. (3.2-2).

(2) A power-law transformation of the form shown in Eq. (3.2-3).

In (1), the only free parameter is c, but in (2), there are two parameters, c and r, for which values must be selected. As in most enhancement tasks, experimentation is a must. This project aims to obtain the best visual enhancement possible with the methods in (1) and (2). **Once (according to your judgment) you have the best visual result for each transformation, explain the reasons for the significant differences between them.**

Image Database Link: http://www.imageprocessingplace.com/DIP-3E/dip3e_book_images_downloads.htm[1]

Part B: Histogram Equalization

(1) Write a computer program for computing an image's histogram.

(2) Implement the histogram equalization technique discussed in Section 3.3.1.

(3) Download Fig. 3.8(a) from the book (GW) website and perform histogram equalization on it.

At minimum, your report should include the original image, a plot of its histogram, a plot of the histogram-equalization transformation function, the enhanced image, and a plot of its histogram. Use this information to explain why the resulting image was improved as it was.

[1] Please download the material as soon as possible. Report broken links (if any) to the instructor.

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Required Format for Submitting Homework Reports

Homework reports should be kept short and organized uniformly to simplify grading. The following format achieves these objectives.

Page 1. Cover Page. Typed:

- Homework title
- Course number
- Student's name
- Student ID
- Date due
- Date handed in

Page 2. Technical discussion. One to two pages (max). This section should include the techniques used and the principal equations (if any) implemented.

Page 3 (or 4). Discussion of results. One to two pages (max). A discussion of results should include significant findings regarding the project objectives and reference any images generated.

- **Results.** This includes all the images generated during the project. Number images individually so they can be referenced in the preceding discussions.
- **Appendix.** Program listings. Includes listings of all programs written by the student. Standard routines and other material obtained from other sources should be acknowledged by name, but their listings should not be included.

Layout. The entire report must be in standard sheet size format (8.5 x 11 inches in the U.S.)

The report should be submitted as a PDF using the ECE1512 Q-page's assignment facility.

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Important Note:

1. **Do not copy material from notes, textbooks, and web pages.**
2. **Images appearing on referenced textbooks, their companion webpages, and your notes are copyrighted material. Except for Figure Fig. 3.8(a), no other figure should be copied or used in your report (without permission).**
3. **A "plagiarism detection" software will be used.**
4. **Check your score prior to submitting your assignment. A score above 10% will be considered excessive.**