CS446 Applied Digital Image Processing
Assignment 2:

CS Program
Habib University

Fall 2023
Due Date: 10 October 2022 @ 11:59PM

1 Introduction

We covered area filtering functions in the last weeks content. The second assignment requires you to apply the knowledge you have gained about area filtering. You have to implement the Bayer demosaicing algorithm [1]. A simple writeup about this technique is given on Medium [2]. Matlab provides an implementation of this paper in the demosaic function [3]. You should check the reference pages of the demosaic function in Matlab to know more [3]. For this assignment, you will create your own demosaic function that should produce identical results to the demosaic function in Matlab.

2 Sample Inputs

Sample input 'mandi.tif' image is shown in Figure 1 and its demosaic version is given in Figure 2. The image should be available to you with your Matlab installation since its in the default images collection provided by Matlab.

Figure 1: The original unfiltered image.

Figure 2: The demosaic image.

3 Deliverables

Provide a Matlab script (.m) file or a Python script (.py) or a C/C++ source file (.c) containing your code. Rename the file to you Habib ID and upload to the Canvas submission module.

4 Marks Distribution

The assignment carries 100 marks. The details of breakage is as follows:

1. Bayer Demosaic Algorithm correctly implemented. (+30)
2. Viva questions were satisfactorily answered. (+30)
3. Code compiles and gives all correct outputs. (+20)
4. Code uses meaningful variable names, follows proper formatting and indentation, has sufficient code comments. (+20)

5 Using chatGPT or other AI software

You are not allowed to use any AI software to obtain the code for this assignment. Appropriate tool will be used to evaluate your submission for AI tool usage. If you are found using such a tool, you will be given a straight 0 and the Academic Conduct will be filed against you for academic dishonesty.

6 Plagiarism Policy

We have zero tolerance for plagiarism. Every submission will be screened using a plagiarism detection software. If there is any evidence of plagiarsim, the case will be reported to the Office of Academic Conduct and all offenders will get a 0. This is applicable even for cases when the code is copied or a significant amount has been obtained from an online repository on open source platforms like bitbucket or github without proper attribution. In case you are taking any material from online sources, we expect that a proper credit/reference is given to the source.

7 Late Submission Policy

Late submission policy as per syllabus will be applied. That is a submission post deadline will have a 20% reduction in grade. An additional 10% reduction will be made per additional day requested beyond the deadline. This means that a late submission after a week will results in a score of 0.

References

[1] Malvar, H.S., L. He, and R. Cutler, High quality linear interpolation for demosaicing of Bayer-patterned color images. ICASPP, Volume 34, Issue 11, pp. 2274-2282, May 2004.

[2] Medium Article. (Accessed on 16 August 2023)

[3] Matlab demosaic function reference pages. (Accessed on 16 August 2023)