Homework #3: Dealing with Noise

Assigned: 08.05.2024 Due: 22.05.2024

1 Introduction

Objective: This homework aims to teach you how to suppress noise using the spatial and frequency domain filters, according to the noise type.

Programming Language: You are free to implement your code in Matlab, Octave, or Python. But indicate which one and which version you used in your report.

Related Topics: The assignment is mostly related to the topics of Lectures 9 and 10 (Image Restoration). But some background topics are also important (Lecture 6 – 8). You can make heavy use of L8_L10 codes.

2 Data

You are provided with the following files in your assignment:

- *IDIP_HW3_Report_ID1_Name1_Surname1_ID2_Name2_Surname2.docx:* MS Word template for your report
- *image_assignments.xls*: This file includes input images assigned to your student ID. (If you are doing your homework in pairs, you will use both images.)
- *images.zip*:
  - *original* folder: contains input images without noise, just for reference
  - *noisy* folder: contains noisy input images that you will use

3 Assignment

3.1 Implementation

Take the images assigned to you as input. Each image contains two major types of noise. Inspect the images and their Fourier spectrums to find out the noise types. Then apply the necessary spatial and/or frequency domain filtering techniques to remove the noise as much as possible. You must generate a figure including at least the input image, its Fourier spectrum, and the final result, for your input (See Figure 1). Note that you will generate two figures if you are doing the homework in pairs. You can also display the results of your intermediate steps. (You cannot remove the noise totally, something similar to the example below will be sufficient.)

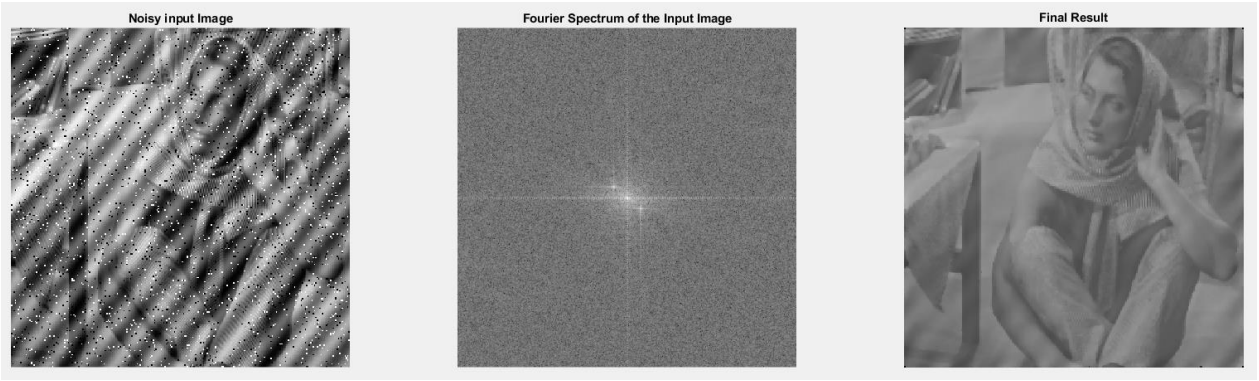

Figure 1: Sample output of your implementation.

3.2 Report

Write a report using the given template. Complete the required parts in the report, rename the file correctly, and save it as a PDF file.

4 Submission

- You can do this homework in pairs (or individually).
- Your submission must include the following files:
  - IDIP_HW3.m (or .mlx, .py, .ipynb) (not txt, doc etc.)
  - IDIP_HW3_Report_ID1_Name1_Surname1_ID2_Name2_Surname2.pdf
- Place all your files in a zip archive with the below name and submit through the MS Teams submission module.

  HW3_ID1_ Name1_Surname1_ID2_Name2_Surname2.zip
- A single submission from one of the team members is sufficient.
- If you have further questions, you can send me a message via Teams.

4.1 Late Submission Policy

The deadline for homework submissions is **11:59 pm** on the specified date. For each additional day, a **25% cut-off** will be applied.

Dr. Zeynep ÇİPİLOĞLU YILDIZ