

Homework 3

Due **in-class, February 20, 2003**

Use the following HPF, **normalized by 1/5**,

0	-1	0
-1	+4	-1
0	-1	0

on the image “SMPTEdegraded” and create a HBF-version with $K=1, 2$ and 3 .

Create an *adaptive HBF* by using the four directional masks h_i , **each normalized by 1/5**,

h_1

0	-1	0
0	+1	0
0	0	0

h_2

0	0	0
0	+1	-1
0	0	0

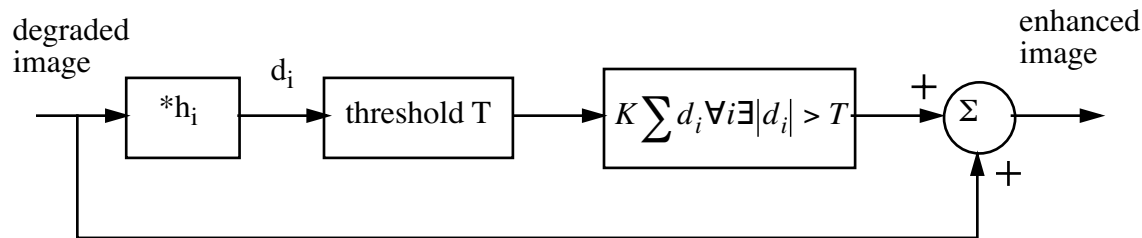
h_3

0	0	0
0	+1	0
0	-1	0

h_4

0	0	0
-1	+1	0
0	0	0

in the following algorithm:



In words, the algorithm filters the image with each of the directional masks, and the outputs d_i , whose magnitudes exceed the threshold T , are summed at each pixel. The result is added to the original degraded image to create the enhanced image. If the magnitude output from a particular mask h_i does not exceed T , it is not included in the sum that forms the enhanced image.

Input image

“SMPTEdegraded” is in SADIE format. It is 8 bits/pixel and has a 512-byte header at the front of the file that contains ancillary information on image size, etc. You can simply skip that header by reading 512 bytes and then read the image.

Tasks

1. Perform the global and adaptive HBF processing on “SMPTEdegraded”
2. Define a measure of performance for this type of HBF processing, and compare the performance of the adaptive HBF and the fixed HBF.

Software

You can write a program in C, Matlab, or IDL to do this assignment. Or, you can do it with the tclSADIE software.

Report

Write a 2-page report (maximum for text, excluding pictures, graphs, etc.) describing your work and include hardcopies of the processed images, graphics and numerical analysis for the evaluation.

You may work with another student on this assignment and turn in one report. In that case, both of you will receive the same grade.