EE 641 DIGITAL IMAGE PROCESSING II
Assignment #2 - Spring 1996
January 25, 1996

In this assignment you will use a C program to compute the optimal causal predictor for the image contained in the file:

/home/yake/bouman/images/pix/achromatic/img15_base.pgm

1) Copy the example C program contained in the directory

/home/albrecht/bouman/bouman/public-web/ee641/C_example

by using the command

cp -r /home/albrecht/bouman/bouman/public-web/ee641/C_example .

Use this example program as a template for future C programs.

2) Compute the empirical mean and spatial autocorrelation function for the image img15_base.pgm . More specifically, compute

$$\begin{aligned} \mu &= E[Y_{i,j}] \\ r_{k,l} &= E[(Y_{i,j} - \mu)(Y_{i+k,j+l} - \mu)] \end{aligned}$$

for $|k| \leq p$ and $|l| \leq p$ and $p = 4$.

3) Compute the optimal prediction filter for $p = 1, \cdots, 4$ using the result of part 2).

4) Compute the image of prediction errors for $p = 1, \cdots, 4$. Remember that the prediction filter assumes a zero mean image so subtract off the mean first. Display and print your results by adding 127 to the prediction error image and writing it out as a PGM image.

5) Compute the spatial autocorrelation for the prediction error images. Plot the autocorrelation functions using Matlab.