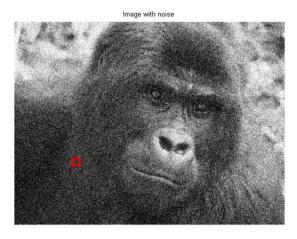# Digital Communication and Signal Processing 2024

Department of Computer Science, University of Warwick

Seminar 8

Image with noise

$$x(1,1) = 10.3 \quad x(1,2) = 10.2 \quad x(1,3) = 10.1$$

$$x(2,1) = 10.2 \quad x(2,2) = 10.3 \quad x(2,3) = 10.1$$

$$x(3,1) = 10.1 \quad x(3,2) = 10.2 \quad x(3,3) = 10.3$$

Assume we have a grayscale image above, and the table denote the small region intensity. If we know that the image has been degraded by a constant power noise of 0.025, and the denote the grayscale at position (i,j) by $x(i,j)$, then

(1) Design a Wiener filter to clean the image.

(2) Find the grayscale value at position $(2,2)$ after applying a 3 by 3 Wiener filter.

(3) Use wiener2 from Matlab to experiment how N and M affect the outcome, where $N \times M$ is the local square area we used to estimate the local mean and variance.